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ABSTRACT

Land use is the subject of the student resource unit to be used with high school vocational agriculture students. Uses of the land in an urban environment, suburban environment, rural environment (as cropland, forest, and others), recreation and parks, and other environments are described. The supply of and demand for land is discussed. Conservation of land resources is treated from two points of view (1) sediment and plant nutrients, and (2) soil formation. The eight land capability classes are described and illustrated. Questions regarding planned land use in a free-enterprise system are raised. The purposes and impact of public lands are described, as are the societal values of land use. Nonrenewable mineral resources present a special problem. Economic, governmental, educational, and religious institutions play a role in land use along with custom and habit. There is an 18-item bibliography. (MS)

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Ag Ed Environmental Education Series

LAND USE

WASHINGTON STATE UNIVERSITY IN COOPERATION WITH THE COORDINATING COUNCIL FOR OCCUPATIONAL EDUCATION.

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- Noise
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- Water

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LAND USE

by

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FOREWORD

This publication is the product of a project carried on by the Coordinating Council for Occupational Education and the Department of Education, Washington State University.

The project grew out of a recognition of the need to include as a part of the high school vocational agriculture curriculum information dealing with the environment, particularly as it relates to agriculture. The project was preceded by a period of growing concern that a body of factual information and teacher resources needed to be developed in this area.

E. M. Webb, associate professor of agricultural education emeritus, first suggested that steps be taken to make available to teachers of agriculture and their students factual information on the environment and agriculture. It was through the efforts of Jay Wood, program director, agricultural education, Olympia, that a project was prepared and approved beginning in September 1970.

Valuable assistance was given the project by many persons from the following agencies: Washington State University, University of Washington, Western Washington State College, Soil Conservation Service, United States Department of Agriculture, United States Department of the Interior, Washington Parks and Recreation Department, Washington Department of Ecology, Washington Department of Natural Resources, Washington Department of Agriculture, Washington Department of Fisheries, Washington Water Pollution Control Commission, Environmental Protection Agency, and Washington Department of Game. Many other agencies provided information for the project.

Three publications were extremely useful in preparing this unit. They were *Environmental Quality: The First Annual Report of the Council on Environmental Quality*, *Environmental Quality: The Second Annual Report of the Council on Environmental Quality*, and *Wastes in Relation to Agriculture and Forestry*. Information from these publications was used as a basis for much of this unit.

Grateful acknowledgment is hereby made to the following groups of people: Dr. C. O. Loreen and Dr. Keith E. Fiscus, both teacher-educators and state supervisors in agricultural education, and Mr. Jay M. Wood, program director, agricultural education, who gave able assistance to this endeavor.

Mr. Glen Olmstead and Mr. Richard Schalo, teachers of agricultural education in Washington high schools, reviewed the unit, developed teaching materials to be used with the unit, and taught the unit to their students. Many other teachers also made valuable contributions to the project.

The following subject-matter specialists reviewed the unit: Dr. Ben F. Roche, Jr., professor of forestry, Washington State University; Dr. Leonard Johnson, collaborator in agronomy, United States Department of Agriculture; Dr. Bruce Florea, extension economist, Washington State University; Dr. Carl Engle, extension soil scientist, Washington State University; and Dr. Alfred Halvorson, extension soil scientist, Washington State University.

This unit is one of eight being produced under the project. The other seven include: *Understanding the Environment, Water, Noise, Agricultural Chemicals and Radiation, Animals, Plants,* and *Air.*

July 1972

Rodney W. Tulloch

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USES OF LAND

Discussion in this unit will center in the United States. Many of the problems discussed will not apply to other countries, especially those that are less industrialized.

Urban Environment

The population in America has had two major shifting patterns in the 20th century. First, people from farms moved to cities, then people from cities moved to suburbs. Two-thirds of the American population live in metropolitan areas, and the percentage is continuing to increase. Three-fourths of the American population live in incorporated settlements of 2500 or more.

Many cities have faced and are facing the situation where the inner city is decaying. This mass of run-down buildings becomes the place where the poor live since they cannot afford to get out. A few cities have had notable success in turning the tide against inner city decay and putting new life back into this area. Philadelphia is an example of a city that has faced the problem and shown that the character of the urban environment can be revitalized.

As the pressure for increased use of urban areas continues, open space constantly dwindles. The pressure for space for new business and industry as well as freeways and parking areas tends to grow with the city. City fathers are hesitant to say no as they visualize an increased tax base.

Many cities require an increasing amount of open space and parks as they continue to expand. As the cities expand, however, the cost of land acquisition also grows rapidly, and the purchase of open space becomes less and less feasible while at the same time becoming more and more necessary. Some cities serve as excellent examples of thoughtful, early planning for saving of large open areas. Examples of cities with large open areas include the Boston Commons, Central Park in New York, Washington's Rock Creek Park, San Francisco's Golden Gate Park, Philadelphia's Pennypack Park (fig. 1), as well as many others in large and small cities. Many species of wildlife do well in these open areas, even in an urban environment. Many persons receive immeasurable pleasure from strolling through such natural areas after being exposed to the hubbub of urban life. In many urban areas, mass transit systems allow some persons to live without owning an automobile, and others who own automobiles can use them sparingly.

A major problem with the inner city is that revenues continue to decline as middle- and upper-class persons leave, thus increasing the percentage of poor people. Buildings are allowed to deteriorate and the tax base dwindles. As public sources of funds diminish, problems arise in providing public services such as police protection, park maintenance, sanitation, and fire protection.

In the all too typical city, there is an area next to the inner city that is less completely deteriorated. This area is usually inhabited by working-class families who often desire to leave the area. These families may remain in the area because of a particular tie to that neighborhood or simply because they cannot afford to get out. Rising property taxes and deteriorating school systems are two of the many factors that may contribute to their desire to get out.

The problems of inner cities are often apparent and many are becoming widely recognized. Solutions proposed for some of these problems tend to be as complex as the problems, and there is often great disagreement among experts as to what the workable solutions really are. Another severe problem is the lack of financing to carry out many of the proposals.

Suburban Environment

The move from rural areas to the cities was motivated by economics. As farms became more mechanized, jobs in many rural areas became hard to obtain. Thus many rural youth were forced to move to the city to find reasonable jobs.

The move from the central city to the suburbs, however, was motivated largely by social preference. Economic and social considerations were such in the movement to the suburbs as to affect the races unequally. People with lower incomes also have been blocked from moving to the suburbs through zoning practices, subdivision controls, and higher costs involved in suburban living.

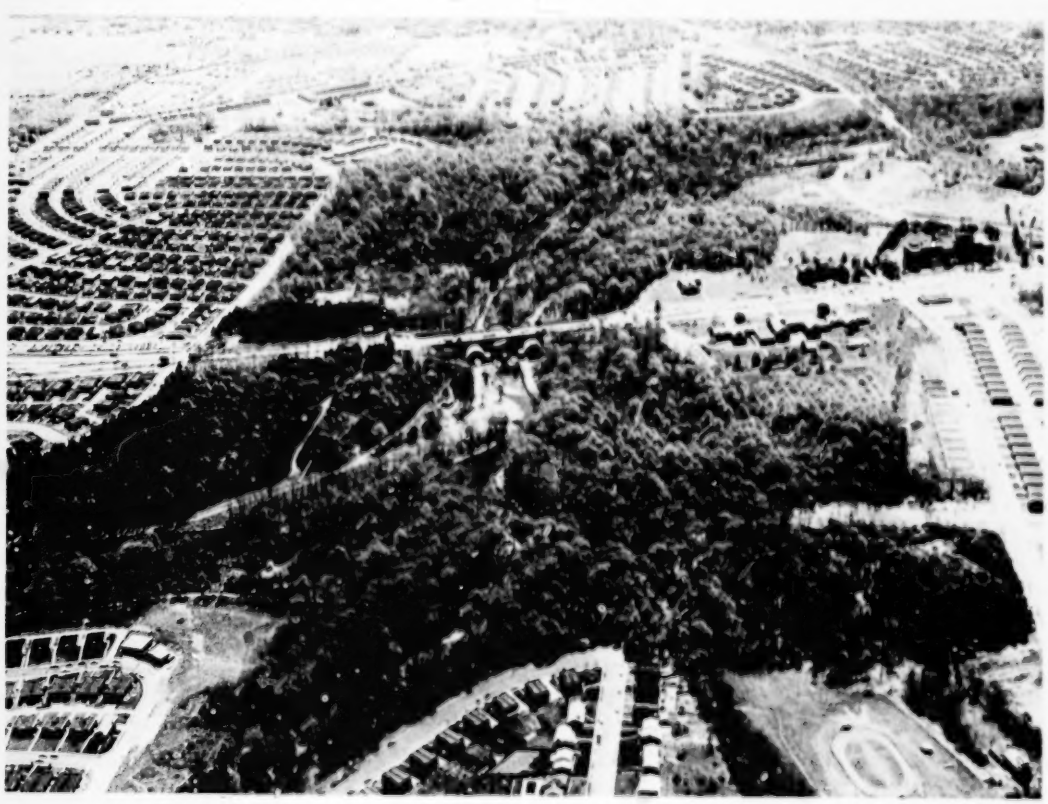

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Fig. 1 Penneypack Park, part of Philadelphia's Fairmount Park system, leaves a narrow strip of open parkland amid large areas of urban expansion.

Suburban population has increased at a much greater rate than that of the central cities. In 1969, 71 million persons lived in suburban areas and 59 million were central city residents. Not only is the numerical power shifting to the suburbs, but also suburbanites often have considerably greater political power due to their social and occupational positions. Their larger proportion of wealth also allows them better legal, medical, and other services. To even further accentuate this trend, some of the professional people are setting up offices in the suburbs where they feel the surroundings are more pleasant, thus offering even greater advantages to suburban living. More and more businesses, especially groceries, have moved to or toward the suburbs, thus making them more accessible to suburban people (fig. 2).

Suburbs seem to many to hold the best combination of being near the city and yet having a good residential environment. Nearby economic and cultural facilities are attractive to many. The suburbs also provide an area of low crime, clean air, open spaces, lawns, and varying amounts of uncrowded and quiet surroundings, and often better education systems.

The outpouring to the suburbs started slowly. One reason for the slow start toward the suburbs was the lack of adequate roads and/or public transportation. Now, most urban areas are crisscrossed with freeways that link them with the suburbs. Thus, the freeways have come to control the suburbs and their expansion. Increased Government loans for housing also spurred building in suburban areas after World War II.

The shift to suburban areas, although different in various parts of the country, has had many common effects. Open space is constantly being taken up for housing with few open spaces or parks being left. Other facilities, such as grocery stores and other suburban developments, also diminish the amount of open space, as do highways and highway interchanges. Airports, commonly located in or near the suburbs, are increasing in both size and number, thus also taking up large areas of land. All these combine to allow less public open space.

Many building construction and zoning practices have contributed to the deterioration of the environment. In the process of building and construction, the land is often stripped before construction begins. This causes severe erosion as well as the destruction of tree and plant cover. Housing projects have often been developed on flood plains, so extensive flood control projects are required to protect the houses from flood hazards. Many of these flood plains were originally fertile areas that were excellent for agricultural production but have now been removed from that usage. Other construction has taken place on watersheds and other areas where water was once able to soak into the soil, thus contributing to heavier runoff, possible floods, and eventual shortages of water. Suburban developments also often

USDA/SCS Photo by DeLand

Fig. 2 Wheaton Plaza shopping center in Maryland.

destroy beautiful natural areas such as ridges, slopes, and even mountains. Trees and shrubs, which not only add to esthetic beauty, but also are important to wildlife, air pollution, and temperature control, are removed and/or destroyed.

According to the *First Annual Report of the Council on Environmental Quality* there are three esthetically important areas in which the present pattern of growth is causing adverse consequences. "First, much commercial development along roads and highways through suburbs is of cheap and unimaginative construction. Gaudy neon signs, billboards, power lines, and clutter characterize this development. Second, many residential subdivisions are visually boring—block after block of treeless lawns, uniform setbacks, and housing designs and street layouts. Finally, wooded streambeds, slopes, and ridges that could help break the monotony of uniform housing developments are often destroyed."

People are becoming more aware of the construction problems that we have faced in our suburban areas. Many local governments and development firms have learned important lessons in working with nature and in developing subdivision units. Careful site planning and development can allow us better housing and help us to meet environmental goals (fig. 3). Developments such as the cluster concept of housing where large, open spaces are left along with the cluster of living units have improved the living environment in some areas. Open space is left, and much less of the natural landscape has to be destroyed. Since the cluster concept also allows for lower initial and service costs, because of fewer roads and less construction for utilities required, it may become more popular in the future. Also, as model cluster concepts are designed and built and people can see the open spaces that result, the demand for such housing may increase.

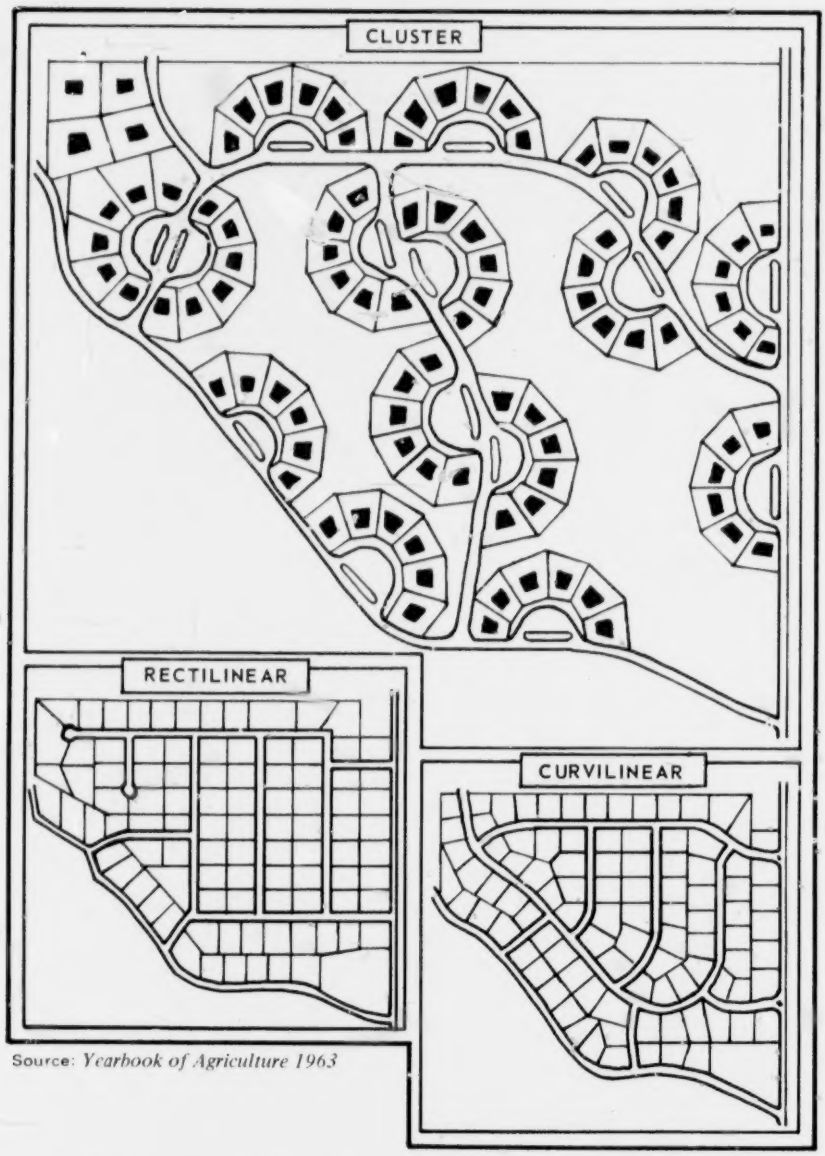
Rural Environment

Polls have long shown a strong American preference for life in rural areas (fig. 4). The economic incentives, however, have been such as to move people toward urban centers. Many rural counties actually lost population between 1960 and 1970. Less than 10 million persons now live on farms, while 53 million live in rural areas, including villages and towns of less than 2500 population.

Cropland

Each year approximately 420,000 acres of cropland are developed for urban uses. About half of this is cropland and grassland pasture. Many persons are becoming very concerned about the rate at which cropland is being taken out of production for other purposes. Many of these purposes cover the land with asphalt or concrete or otherwise devastate it in such a way as to make it economically unfeasible to put it back into agricultural production. Cropland is being taken over for wildlife refuges, recreation areas, parks, highways, and airports, as well as for other urban development.

Between 1950 and 1967, the number of farms diminished by 2.5 million, and the number of acres harvested decreased by 34 million. In 1969, there were approximately 334 million acres of harvested cropland; another 98 million acres of cropland lay idle.



Source: *Yearbook of Agriculture 1963*

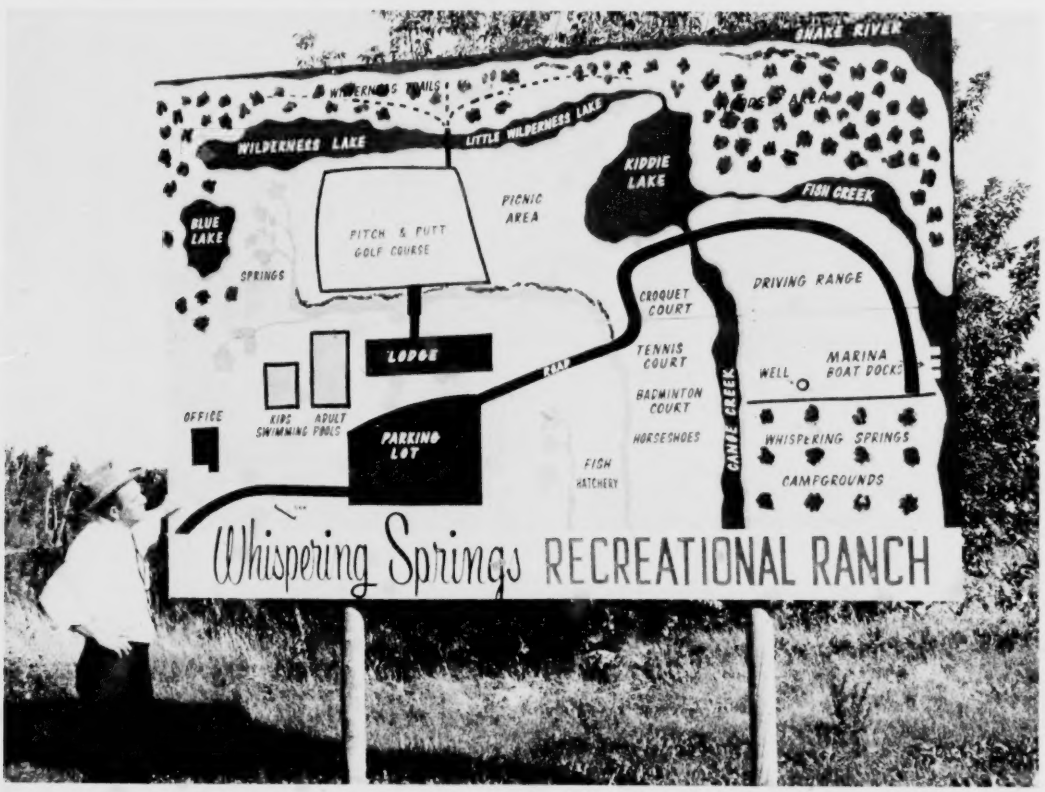
Fig. 3 Alternative treatments of an actual site with hilly terrain. All three treatments had 94 lots. In the conventional schemes, they were 1 acre each. The outer lots were reduced to 3/4 acre so that about 24 acres of common area remained. The cluster plan used 6000 lineal feet of street compared to 12,000 and 11,600 for the rectilinear and curvilinear schemes, respectively, and had improved circulation and storm drainage.

The first request in the Lord's Prayer, "Give us this day our daily bread," expresses well the emphasis man has placed on his need for food. The hand-to-mouth existence that has characterized man's history has been somewhat lessened in the 20th century in the Western world. Many factors, such as war, may change the supply of food and fiber in a very short time.

Estimating cropland needs for the future requires looking at crop and livestock productivity trends, levels of use of food and other agricultural products, and increased populations at a given point in time. Since many of these are based on numerous other estimates and assumptions, highly precise predictions are impossible. The increased productivity that can be expected from technological and scientific changes is extremely hard to predict. A major breakthrough could quickly increase the quantity or quality of agricultural products. Changes in amounts and/or kinds of agricultural products consumed can also change the situation very rapidly. Production of artificial materials can also affect the demand for agricultural products.

Forests

Estimates of the land required to meet future demands for forest products require consideration of many factors. Important factors include production practices, demand for forest products, type of forest products desired, recycling of forest products, costs of forest products, and availability of substitute products. Forest products, in general, tend to be more elastic in demand (demand changes more readily with price) than food products.



USDA/SCS Photo

Fig. 4 People enjoy visiting rural recreation areas.

The value of production may vary greatly with the type of use made of the forest. Multiple use is the incorporation of more than one use of a forest. Multiple uses may take place through seasons of the year or even over a period of years through rotation. The five main areas of multipie use are: timber production, water, recreation, wildlife, and grazing (fig. 5). When forests are used for some of the purposes other than just timber production, they may become more desirable socially.

Many forests act as watersheds as well as producing timber. A watershed can be used for such purposes as domestic consumption, production of power, and for irrigation. The limited runoff helps cut down on erosion and flooding as well as eventual drought.

USDA Photo

Fig. 5 Douglas fir along Quinault nature trail, Olympic National Forest, Washington.

As recreation areas with abundant wildlife, many forests serve as outstanding areas for hunting and fishing. Forests also serve as popular camping, hiking, and nature study areas (fig. 6). As a source of recreation, forest areas are used for skiing, fishing, hunting, lake resorts, camps, and parks.

There are many concepts involved in use of land for recreation. Some are extremely important in determining the access the public will have to recreational areas; some require rather conflicting types of management, depending upon the alternatives chosen. Many kinds of recreational activity can be carried on in forest lands using the esthetic value of the area without actually consuming any of the material. Even though persons using such an area do not use any of the materials or take anything away, they do influence the habitat of the area through their use of it. A growing problem in natural areas is the litter often left behind by careless people. Other types of recreational activities may actually expend certain items from the forest area. Examples of these are hunting and fishing. In such activities, part of the desired commodity is used up. In most cases, all uses are not possible in a given area; therefore, priorities as to which are more important need to be decided.

Certain Government agencies have varying views on whether the ideal situation in public land is conservation or preservation. Conservation or wise use of land in order to maintain the land while still receiving some benefit from it is the basic philosophy of the United States Forest Service. Preservation is more a philosophy of putting aside land in its

USDA Photo

Fig. 6 Campers in Sawtooth National Forest, Idaho.

natural state with little or no use. The concept of preserving natural areas has been used to some extent by the National Park Service. Which of these concepts—conservation or preservation—is better? Do we need some public land set aside for each of these purposes? If public lands become extremely scarce and both of these types of uses cannot be carried on, which should receive higher priority? These are questions that must be answered before action can be taken.

Another question that needs to be answered is who should pay for the facilities necessary for recreation on public land?

One philosophy is that State and national parks and other such areas used for camping sites and requiring lifeguards, toilet facilities, showers, tables, and other facilities should be paid for by those who use them. In other words, an entrance fee should be charged to cover the costs of operation. The other philosophy is that these facilities should be open to the public and be developed and maintained through the use of public funds.

Land for use in recreation has tended to be one of three major classes: First, the land may be owned by the public, with facilities and uses developed at public expense under the direction of public agencies, and with operation and control by a public agency. Second, private development may take place where recreational facilities are developed and for which a charge is made. As demand for recreational facilities increases, it will become more profitable to provide them (fig. 7). Some examples of recreational facilities that may be set up in this way include ski and water resorts, camping grounds, and hunting and fishing areas where game is produced by the landowner. In the third type, a cooperative agreement, landowners may be paid by the government for use of their land for public hunting and fishing; or Government-owned land, such as a park, may be partially leased to concessionaires.

Another use of forest lands is for grazing. Public lands have long been leased for grazing purposes. Such leasing arrangements have produced large numbers of cattle and sheep throughout the Western United States. The leasing of public lands for grazing has many benefits. These include better utilization of native grasses for the production of products desired by the general population. The low leasing costs allow cheaper production costs of

USDA Photo

USDA/SCS Photo by Tinsley

Fig. 7 Demand for outdoor recreation generally far exceeds the supply, which is why farmers and other rural residents may find it rewarding to provide recreational facilities.

meat and wool which eventually benefit society. Land is used that is too marginal for private ownership. Public ownership allows the use of skilled management to help protect delicate resources and creates increased private industry that would be impossible without public ownership. There are some negative problems involved in the grazing of forest areas. These include animals destroying new plant growth and scraping off bark by rubbing against the trees. Soil is compacted and roots and young leaders are trampled by animals. Finally, cattle and sheep may produce less than desirable competition with wildlife.

Dr. Ben Roche, Jr. of the Forestry and Range Management Department at Washington State University says that the negative aspects of grazing have been overstated. Evidence of direct destruction is insignificant in a vast majority of cases. Where damage is most obvious, it is usually due to bucks and elk bulls working off their antler velvet on aspen. Soil compaction may be a problem with overcrowding near water or in a fence corner. It is, however, less likely than similar damage on a campsite where people are packing the soil. While cattle and sheep may compete with big game, evidence is mounting that when properly managed their effects are desirable.

Other Rural Land Uses

With the increasing problems that have accompanied growth of urban areas, some industries have bought land in rural areas to develop plants. This move to rural areas has been facilitated by the building of major interstate roads. It then becomes impossible for many of these areas to be used for agricultural purposes as population increases and taxes go up. A later discussion on zoning will cover some of the problems involved in this area in more depth. The areas surrounding many urban areas and even smaller cities and towns have been bought by persons wanting to escape from life in the city (fig. 8). Many of these persons, while developing extremely attractive homes in the country, have removed rather large amounts of farmland from production. Land in rural areas is also being used by such groups as the military, the Atomic Energy Commission, and the Corps of Engineers.

Recreation and Parks

In the past, Americans in general believed in the work ethic and shunned idle periods. The goal of many families centered around a reasonable living and getting ahead. As the average production per hour increased, better living standards were attainable with fewer hours of work. Thus, Americans as a whole have more leisure time than in the past. Since a large number of persons work indoors, they are anxious to spend at least part of their leisure time outdoors.

Demands for outdoor recreation are increasing rapidly as a result of the growing population, the trend toward a shorter work week, rising levels of income, changes in mobility (ability to move around), changes in attitudes toward recreation, and increased advertising given to recreation. The rapid population growth we have experienced has to be considered a major reason for increased demand for outdoor recreation. Sheer numbers of people are overburdening many outdoor recreational facilities. The high density of people in some national parks has already made them not nearly as desirable for people who are trying to get away from it all (fig. 9).

The 5-day work week has also affected outdoor recreation by giving families the opportunity to spend weekends in the great outdoors. Experiments with the 4-day week and with holidays falling on Mondays to give 3-day weekends has extended outdoor recreation possibilities to even more remote areas. Increased lengths of paid vacations allow families to travel greater distances to scenic areas and historical sites. Combined with the increased time, many families have increased incomes that would allow them to do more traveling. Better communication about available parks and recreation areas and better transportation to them has been an additional stimulus to outdoor recreational opportunities. Interstate highways make it possible for a family to travel many hundreds of miles by car in a few days. By airplane it is literally possible to travel around the world in a couple of days. If you want to see some of the scenic beauty and spend time looking at historical sites, it will, however, take much longer.

USDA Photo

Fig. 8 People commute many miles to live in pleasant surroundings.

Many outdoor recreation activities are free and many others relatively inexpensive. Some of the more popular such activities are driving for pleasure and outdoor games and sports like swimming, hiking, sightseeing, and bicycling. Although many of these activities are available to all, certain segments of the population are more likely to take advantage of them. Factors such as age, income, education, occupation, and place of residence influence participation in outdoor recreation.

Use of national and State forests and parks has been increasing steadily along with the sale of hunting and fishing licenses. Camping, hiking, swimming, and boating enthusiasts are increasing in number. The trend toward increased participation in such outdoor activities has sent the Park Service and other agencies scurrying for new sources of land and recreational facilities. One of the major thrusts has been toward multiple use of present holdings by governmental agencies as well as by private landholders.

Predicting the demand for outdoor recreation is as difficult as estimating many other land-use demands. The demands for recreation will depend on such things as world peace, population trends, attitudes toward recreation, and the ability of people to afford outdoor recreation. Therefore, predictions of future trends vary widely due to the assumptions made, leaving considerable uncertainty.

Well-planned development and management of outdoor recreational areas will be important in determining the type of environment in which we will live in the future. With good planning and management, outdoor recreation needs can be met for the foreseeable future with only moderate increases in recreational area. Recklessly shifting land from other uses to that of outdoor recreation could have disastrous results. For example, large-scale

USDA/FS Photo by L. J. Prater

Fig. 9 Sherando recreation area in the George Washington National Forest, Virginia.

shifting of land from agricultural use could severely limit the production of agricultural products. Without careful planning, this could drastically increase the cost of food and other agricultural products. Shifting of land from private ownership to public recreation areas could also cut the tax base for the local area. In some cases, newly developed public recreation areas compete with already established private industry.

Increased recreational facilities will require other additional facilities such as businesses and housing. The increased demands for these other facilities will continue to increase land prices and may completely change the availability and economic feasibility of using the land for agricultural or forestry production. Depending on the amount of land shifted to recreational uses and the type of recreational use, job opportunities may change drastically. The change from farmland to a park could lead to a loss of farm people and loss to the economic base of the area, at least temporarily. Workers brought in to construct facilities at the park would increase employment and payrolls in the area. Developing, managing, and maintaining the recreational area and nearby facilities may be sources of job opportunities. People will be needed to operate motels, restaurants, and other businesses to serve the needs of tourists and visitors. Job opportunities will likely fall into three major areas: First, people will be employed in the construction, operation, management, and maintenance of new and expanded recreation areas. Second, opportunities may become available for expanded or additional new recreational facilities in the area. Third, there will be opportunities for employment and service and supply businesses that serve the needs of recreation enthusiasts.

Every person who lives along a reservoir, owns a wooded area, or is located near a highway does not automatically have a gold mine in terms of developing recreational areas, services, and supply businesses for tourists. Development of these kinds of businesses requires investments of money and business skill. There is little doubt that not all of the increasing demand for recreation can or will be met by Government agencies. Excellent opportunities for private development will be available. The rapidly rising increase in use of private and public recreational areas may call for rapidly increasing road maintenance, pollution control, and police and fire protection. The demand for these services may come so rapidly as to catch some small communities almost unawares. Solving these problems will require increased public funds obtained by increasing taxes. Who should pay and how much will be increasing issues of debate in many rural communities.

Many failures of small businesses can be attributed to inexperience or incompetence. A marginal farmer who changes his operation from farming to outdoor recreation may not possess the needed managerial ability and is likely to fail. Another serious problem in establishing outdoor recreational facilities is that they depend for success upon the public's fickleness and demand. A sport that has been relatively popular can become much less so in a very short time. Unseasonable weather or a temporary breakdown in the transportation system can spell complete disaster for a highly seasonable business. Although a few types of outdoor recreation can be established for a very low investment, many types require thousands and even millions of dollars to establish. The *1963 Yearbook of Agriculture* has some interesting information on farm ponds.

> Thousands of farm ponds built for other purposes can be used for fishing, swimming, and boating, but many are hard to reach and others cannot be managed without sizeable outlays.
>
> An example is the experience of a farmer in Schuylkill County, Pennsylvania, who built a 5-acre pond that his family, employees, and friends could use. He stocked it with fish, built picnic tables, and landscaped the area. A few group picnics and carloads of visiting fishermen convinced him that his pond was a liability if he did not restrict his use carefully. Visitors broke up his picnic tables for firewood and left his grounds littered with trash. He learned also that he would be financially liable for any accidents.

On the other hand, hundreds of similar ponds provide thousands of hours of recreation for farm families and friends. The smaller ponds usually have very limited productivity for commercial operations, but larger ones frequently provide the central core for active commercial enterprises run concurrently with the farm business or as a substitute for farming.

It is obvious that careful planning must be done before even a farm pond for family use is developed. Commercial developments require even greater capital outlays and more planning. Because of the number of losses in family-sized outdoor recreational facilities, bankers generally have become very skeptical in loaning money for such development.

Other Uses of Land

Because of man's attraction to water and the adjoining land, special zoning and other legal requirements must be placed on public access to preserve part of the beauty of nature. The growing numbers of persons living around and camping near water bodies has increased the danger of water pollution. Increased water pollution has in many areas endangered human health as well as plant and animal life. Many of these areas have changed from their beautiful natural conditions to become offensive to the eye and nose and are now virtually eliminated from the list of desirable places.

Where the land is rich in, or underlain by, valuable minerals, it is often mined. Mining operations often have severe effects upon the landscape. Areas that have been strip mined are often left unprotected, their beauty destroyed, and ready for erosion and other natural hazards to run rampant. In recent years, many governmental agencies and mining companies have cooperated to restore some of this land to at least part of its original beauty and to cover it with vegetation so as to stabilize the material left behind.

Shaft mining has also had adverse effects in some areas. Sections of land have sunk into undermined areas destroying houses and other property. Abandoned shaft mines have also been sources of pollution. Water has seeped through some of the tunnels washing acid materials into underground streams and water sources.

SUPPLY OF AND DEMAND FOR LAND

Supply of Land

The amount and location of land is basically fixed. Although water areas may be filled in to increase land surface and ponds dug to decrease land surface, such changes are insignificant compared to the total surface of the earth. Although the total supply of land is fixed, an important consideration is that not all land can be used for all purposes. Most of the land surface on earth can be used for something, but only limited areas can be used for efficient agricultural production. In order for land to be used for agricultural production, several factors are important: climatic or weather factors; soil properties (inherent) and related topographic features; and economic factors.

Climatic or weather factors will not only influence the types of crops that can be grown, but also the expected yields. The effect of climate is also interrelated with topographic and other properties of the soil. Since crop yields and types of crops are affected, economics are also involved.

Soil properties, such as texture, structure, organic matter content, and available nutrient supply, will also affect yields and types of crops that can be produced economically.

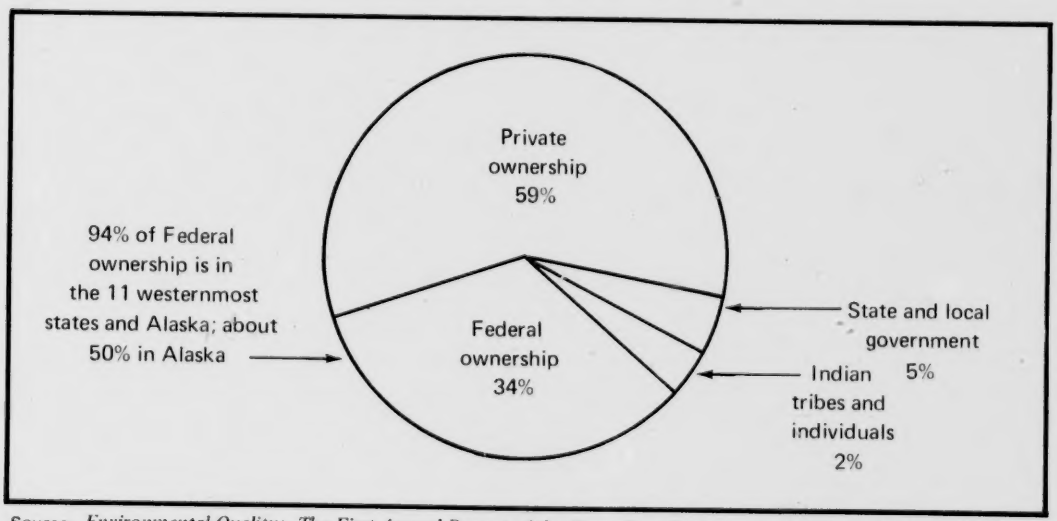
Economic factors, such as proximity of markets, have also had a great influence on the types of crops grown.

Land that is located in a comfortable climate, is level, and is high in available nutrients with high organic matter content is good for many purposes. These purposes may be mutually exclusive, that is to say, the land can only be used for one purpose. For example, land cannot be used for both a parking lot and raising a crop at the same time. Thus, a decision as to the use of the land must be made. Deciding what use or uses will be made of land is often a very complex process, and often the decision made does not consider the best interest of most of the people. This is true in part because the landowner is free to do various things on this property. Certainly the privilege of doing what a person wants on his own property is important as long as he is not severely infringing on the rights of others. Present land ownership is shown in figure 10.

The earth's surface area is almost 200 million square miles, but only about a quarter of that area (55 million square miles or 35.7 billion acres) is land surface. Part of the land area is covered by ice, some has been built upon, much is wasteland, other parts are potentially productive but presently unused, and large areas are unusable for many purposes. Steep slope is one reason that land may be unusable.

About 3.2 billion acres of the land surface is in crops or is fit for crops. About 5.8 billion acres are used for meadows and pasture, and 9.5 billion acres are forest land.

In the United States, some land is used for several purposes. This multiple use can cause an overlapping when figures of acreages of land use are given. For example, land may be in forest and also be used as pasture and grazing land. Figure 11 shows land use in the United States according to the United States Department of Agriculture.


Private ownership 59%
94% of Federal ownership is in the 11 westernmost states and Alaska; about 50% in Alaska
Federal ownership 34%
State and local government 5%
Indian tribes and individuals 2%

Source: *Environmental Quality: The First Annual Report of the Council on Environmental Quality, 1970*

Fig. 10 Land ownership in the United States.

Demands and Requirements for Land

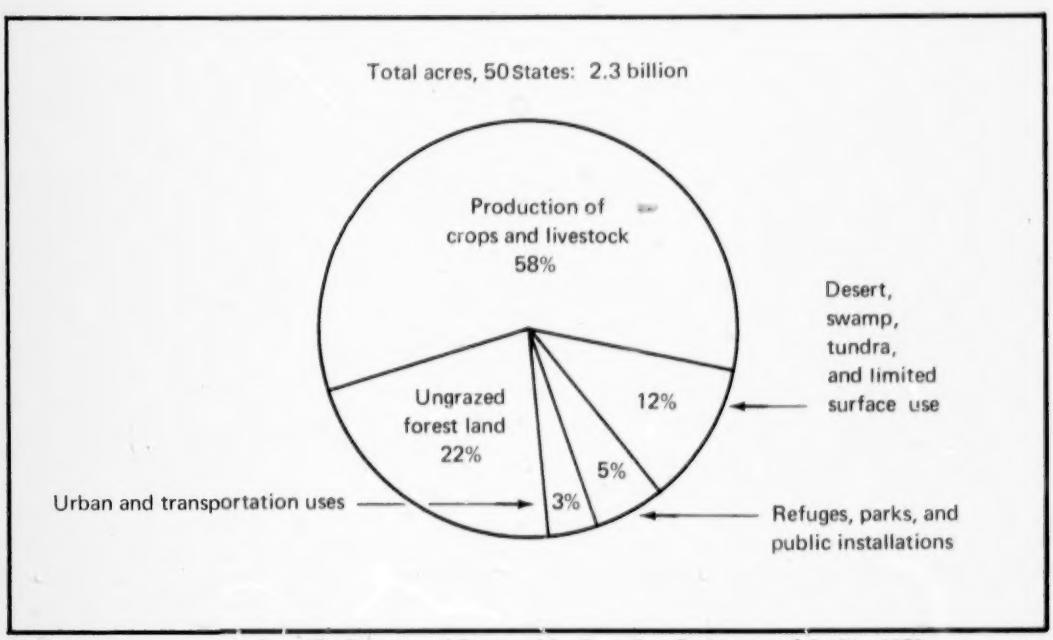
Increasing population, with the accompanying increase in the demand for food, housing, roads, and recreation areas, increases the demand for land. The demand for land is also affected by technological advances, consumption and buying habits, and production.

An important factor in the demand for agricultural products and, consequently, agricultural land is the type of diet. For example, in the United States where the diet is generally high in meat and other products that require a high calorie input per consumable unit, more grain and forage production per person are required than in a country where grain is the main part of the diet. The amount of land required is a function of several factors, including productivity of the land, so that direct predictions of land demands for agricultural purposes cannot be based only on demand for food, type of food, or increases in population.

Rural land is also being used for other purposes. Figure 12 shows the annual conversion of rural land to nonagricultural uses.

Increasing population means more demands for nonagricultural land and mineral and material resources as well as for agricultural land. Thus, the demand on land-related resources has increased at a disproportionately greater rate than the increase in population. This is due to greater per capita income, leisure time, and rising (or inflated) expectations. Therefore, controlling population is not going to solve our ecological dilemma. A change in life style is also needed.

Urbanization has continued to consume considerable amounts of land each year because, as the cities become more crowded, the people yearn to escape to the suburbs where the lots can be bigger and there is more open space. This desire, along with improved



Source: *Environmental Quality: The First Annual Report of the Council on Environmental Quality, 1970*

Fig. 11 Land use in the United States.

transportation, has led to rapid growth of the suburbs. Expressways and improved roads have also led to new developments such as industrial parks. All of these activities have contributed to increased demand for land.

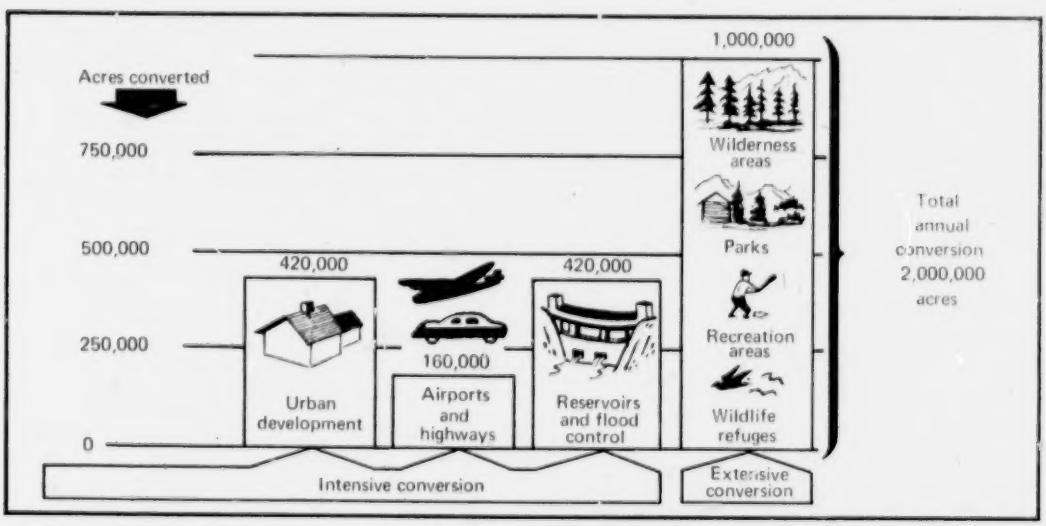
Location is an important factor in the demand for land. As an urban area expands, land near it becomes desirable for many purposes, and the demand is likely to soar rapidly.

Economics of Land Use

The law of supply and demand is a basic concept in our economic thinking. Although the supply of land is basically set, the uses that can be made of it may greatly affect its economic value. Also, the amount of land required for certain purposes may greatly be affected by productivity. For example, if it takes 2 acres of pasture land to support one steer for a year the demand requirement for this purpose will be the number of steers times 2 acres. If better practices or a new variety of grass can reduce the land requirement to 1 acre per steer, the land supply for this purpose will have been effectively doubled. Such increases in productive capacity can considerably decrease the demand for land for the purpose for which it has been used. This decrease in demand may in turn, greatly affect land prices.

Land prices are affected by location and supply as well as economic prosperity. Improved roads, drainage, water supplies, and other factors may greatly increase the value of property. In times of economic depression or recession, land prices can decrease. If a dirty, noisy, or odoriferous industry moves into a new neighborhood, however, land values may drop.

Discovery of mineral deposits may greatly increase land value, but depletion by mining may result in a decrease in value. In times of economic recession or depression, land values can decrease. Land values may also be affected by governmental laws and regulations, land use, and land purchases.



Source: *Environmental Quality: The First Annual Report of the Council on Environmental Quality, 1970*

Fig. 12 Annual conversion of rural land in the United States to nonagricultural uses.

Land Development

"Subdividing" and "development" are sometimes used interchangeably. There are, however, some important differences. When subdividing, the goal is to partition or section larger areas into lots or small tracts by use of division lines. Usually as little money and effort as possible are put into the project. Often, only what is required by law is carried out.

Thorough development, on the other hand, requires long-range planning and often great expenditures. The buyer of a small lot or parcel of land is often unaware of the large costs of development. This frequently causes people to make remarks about the extreme differences in cost of land per acre before development and the cost of 1/3-acre lots after they have been developed. Many persons conclude that the developer is getting rich. They do not consider all the costs that have gone into developing the land. There are lots in many places across the country which have been developed at great expense and which many years later have not been sold. Some of these developed areas have large arches and pillars at the entrance to help attract persons to the area. Some of these stand as monuments and reminders that only experienced persons who have some knowledge of real estate, business, and engineering should take on such difficult management activities. Some of the expertise necessary can, of course, be hired to carry out certain parts of the plan.

Some large-scale developers plan entire communities. This is relatively easy to do in a new suburban area, but in urban and urban fringe areas any development must be based on the pattern and facilities already present.

In some suburban areas where the land that a developer has obtained or is planning to obtain fits into correct zoning patterns, he has much more freedom. He may be able to plan or work with existing plans to provide shopping areas, schools, churches, and transportation and recreational facilities. He will likely have included many of the following before selling lots: water mains, sanitary sewers, street grading and paving, curbs and gutters, and possibly filling and landscaping. It is also possible that he will put in underground electric and telephone cables and other utilities to avoid the use of telephone poles and wires through the development site. Part of the development may also include a wooded area, open space, and recreation area.

On the other hand, a beautiful "bedroom" community (a place where people live and sleep but who work and shop somewhere else) may be developed where all the services are in another community. Such an area obviously requires less investment than does one that must provide for most of the community needs. Regardless of the type of development, long-range planning is very desirable. It is important that access to nearby urban areas be provided. Convenient connections with nearby major roadways is also an important consideration.

Another type of development concept that is increasing in popularity is the cluster. This concept (see fig. 3 and its discussion) offers several advantages, including lower initial costs because of fewer roads and other service facilities, and at the same time more open space. It has the big advantage of disturbing less of the natural surroundings.

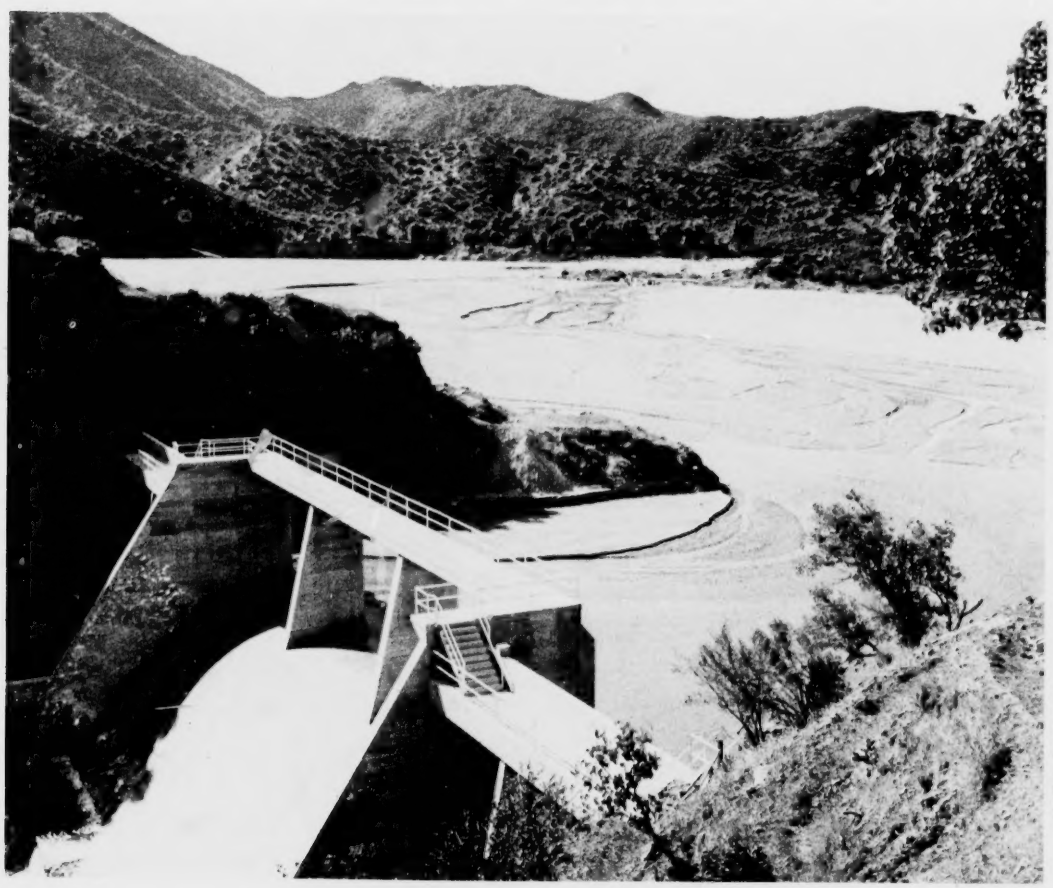
As land becomes more scarce, and people become more concerned about their environment, we shall likely develop new methods of coping with housing problems. For example, in large cities, block after block of roof space is not being used. These large unused areas might be converted to playgrounds or other kinds of recreation areas or even for growing shrubs, flowers, vegetables, and herbs.

Development in most rural areas has been relatively slow. With the increasing desire to avoid urban problems, some companies have been moving their operations to smaller towns and rural areas. This allows some of the pressure to be removed from the urban area, better use can be made of the resources of some of the rural areas, and more employment opportunities are provided for rural people. However, some of these industries have pollution problems that have not been solved, so that, in some cases, the industry that a small town or rural area was so happy to get became a mixed blessing as it polluted the air, water, or other aspects of the environment.

CONSERVATION OF LAND RESOURCES

Sediment and Plant Nutrients

There are many sources of sediment. Erosion-caused sediments represent the greatest volume of wastes entering surface waters. The volume of sediments reaching U.S. waters is in excess of 700 times that of the total sewage discharge loadings (see fig. 13). Sediments



USDA Photo

Fig. 13 Silt from denuded watersheds have choked reservoirs, led to floods, and wasted water.

are carried off in runoff from cropland, unprotected forest soil, overgrazed pastures, strip mines, roads, and unprotected urban areas. Total sediment production in the United States amounts to approximately 4 billion tons a year. In a series of samples taken all across the nation, the amounts of sediment varied widely—51 to 10,000 tons per square mile. The amount of sediment varies greatly as a result of many factors, including soils, geology, topography, precipitation, vegetative cover, and conservation practices. That each of these factors has important effects on sedimentation has been proved time and again across the country. Many experiments run at experiment stations have proven that sediment can be reduced by use of good conservation practices.

In 1969, the Federal Water Quality Administration, which has now become part of the Environmental Protection Agency (EPA), issued a report. In this report it was estimated that the average sediment yield during a rainstorm at highway construction sites is about 10 times that for cultivated land, 200 times that for grass areas, and 2000 times that for forest areas. The exact amount would depend on the amount of rainfall, the slope of the land, and the exposure of the bank. Similar amounts of sediment may be produced on commercial and industrial construction sites.

Sediments contain various amounts of plant nutrients. Thus, controlling sediment will also help control plant nutrients entering surface waters. To meet ever-increasing food demands has required higher crop production, which, in turn, has required the application of greater amounts of plant nutrients. In 1966, Americans applied 32 million tons of chemical fertilizers. These fertilizers were applied to lawns, gardens, orchards, fields, forests, and pastures. This seemingly large tonnage of commercial fertilizers is often blamed for the adverse effects of plant nutrients in surface water, when the largest source of plant nutrients is municipal sewage.

Soil Formation

One of the major considerations in conservation of land resources is "our" soil. We may refer to soil as "our" soil since all of us are dependent on the soil for food. 'Soil" is often used to collectively refer to all soils just as "vegetation" is used to refer to all plants. Soil includes the mineral particles (sand, silt, and clay) and organic materials that cover most of the land surface of the earth. The major areas where soils do not cover the land are steep and rugged mountain peaks and areas covered with ice and snow all year long.

Soil is related to the earth much like peach skin is to a peach—they are both relatively thin. There are differences. The skin of a peach is of relatively uniform thickness, while soil depth varies greatly. Series of depressions (synclines) and rises (anticlines) leave sections of land with slopes of varying steepness. These varying topographic features make it very difficult to manage land.

Soils vary greatly in color. They may be yellow, red, black, brown, gray, or a combination of these and other colors. Soils are a mixture of sand-, silt-, and clay-sized particles; organic matter; and stones or other materials.

Parent Material

Most soils have developed from rock by natural physical and chemical processes. Material from which soils are formed is called parent material. Composition of parent material is one of five important factors in soil formation. Some of the major types of

parent rock are sedimentary rocks such as sandstone, limestone, and shale or igneous rocks such as granite and basalt. The parent rock has a strong influence on the kinds and amounts of minerals that will be found in soil and on the size of soil particles. For example, soils developed from sandstone are coarse textured (sands), while those formed from shale are finer textured (clays). Those formed from limestone are usually much darker in color (browns and reds) and are finer in texture. Soils formed from granite are the sandy loams and tend to be low in natural fertility.

Although soil is formed from parent material, the material underlying the soil is not necessarily the one from which it was formed. Sometimes after nature has formed a soil, it is moved to a new location. Thus, a soil formed on limestone bedrock may be moved to an area underlain by granite bedrock. Nature may move these soils with water, wind, gravity, or ice. Large layers of ice called glaciers had a considerable effect upon soil formation in many parts of the Northern States. If the deposits of these materials are thick enough, say approximately 10 feet, the underlying parent material or bedrock may have little or no effect on the soil that develops.

Climate

Climate is an important factor in soil formation. It influences, not only the kind of soil formed, but also the rate of formation. Bedrock is broken up by chemical weathering, wetting and drying, freezing and thawing, and other natural forces. Chemical weathering is the most important soil-forming process, but will not be covered in detail here since it is covered in most books on soils. Acids are some of the chemical materials that contribute to soil formation. Alternate wetting and drying of rock material cause it to expand and contract so that particles are loosened from it. Water may also enter cracks and, if frozen, may pry the rock into separate pieces. Rain water pounding against the surface of the rock may also loosen particles. As fine particles begin to accumulate and enough water and plant nutrients become available, plant life can be supported.

Life

Another important factor in soil formation is life. One of the first lower forms of life to grow on rock surfaces is lichens. After many years of growth of such lower forms of plant life, organic matter and available mineral nutrients may increase, and higher forms may become established. As organic matter and weathered mineral matter continue to accumulate, grasses or trees may become the dominant vegetation on the landscape. Upon examining the soil, you can see earthworms, ants, and various other animals, including gophers and other burrowing rodents, all of which assist soil formation.

Topography

Topography is also an important factor in soil formation. The length and steepness of a slope, even its shape, may have important effects on soil formation. Generally, soil formation is quite uniform in level areas. As slope increases, the soil formed tends to move down the slope so that, in an area of hills and valleys, the valleys tend to have rapid soil accumulation while the hills may have little or no soil accumulation. Rain will also run off

more rapidly as slope increases, allowing less moisture for soil formation and plant growth. As plant growth is slowed down, so is soil formation, so land on steeper slopes tends to produce soil more slowly, other factors being equal.

Age

Another factor that is important in soil formation is time or the age of the soil. The age of a soil may be thought of in three different ways: ecological, geological, and pedological. The ecological age of the soil is measured from the time that it was first able to support plant growth. The geological age is the number of years since the parent material started to form soil. The pedological age is based on the maturity or distinctness of horizons within the soil profile. A horizon is simply a layer in the soil profile.

It is common to refer to land as soil when it has developed enough to support plants. Thus, when a sand dune begins to support plant life, it would generally be called soil. The amount of time that it takes to form soil depends greatly upon the type of parent material. Lava that has flowed from an active volcano may support some weeds within a few months after it has cooled although it is still not a soil. On the other hand, soils developing from limestone or granite bedrock may take 4000 years or more to become mature.

Land Capability Classes

Much of the following information on land capability has been taken from *The Measure of Our Land* or adapted from it. For many years, the Soil Conservation Service has used the land-capability classification as a practical means of helping farmers and ranchers make conservation plans for their land. It stresses the soil features that limit what uses can be made of the land without risk of damage.

The land capability classification of these soils or any area is based on a soils map, and the soils are grouped at three levels. Soils maps made by the Soil Conservation Service and some land grant universities show varying details about the soil. The land capability units are arrived at from information given on the soil map. All soils that have about the same soil management needs and produce about the same yields are grouped together and are given a local land capability unit designation. Each local land capability unit designation is then given a local definition. Subclasses and classes, on the other hand, have nationwide definitions to make them useful to many people. The subclasses designation suggests the kind of limitation present for the particular soil. For example, "e" stands for erosion, "w" for wetness, "s" for unfavorable soil in the root zones, and "c" for adverse climate. These letters are usually given following the Roman numeral class designations. The Roman numerals designating class suggest broad classes of degree limitations; the higher the number, the greater the limitation and therefore the fewer the choices for safe use. Each of the eight land capability classes will be discussed briefly. For a more detailed discussion, see any basic soils textbook.

This land-use capability classification scheme is predicated upon agricultural use requirements and is not nearly so useful in determining the capability or suitability of land for noncrop uses.

Class I

Class I contains soils that are nearly ideal for some of the common field crops. They can be safely cultivated year after year with no special treatment to control runoff or conserve the soil. They are nearly level, and the risk of erosion by either wind or water is low. They are deep, well drained, and easy to work. They hold water well and are either fairly well supplied with plant nutrients or respond well to fertilizer (see fig. 14). The local climate is favorable to the common crops. Class I land is suited to a wide range of crops and is not subject to water overflows that damage crops.

Class II

Soils placed in class II have limitations that reduce the choices of plants to be grown or require some conservation practices. The limitations are few and the practices are easy to apply, but the land user has less leeway than with class I land. Practices that may be required for gently sloping and deep class II land are contour tillage, strip cropping, stubble mulching, and cropping systems that include grass and legumes (see fig. 14). Some class II land is nearly level and somewhat wet but can be drained easily.

Class III

Soils placed in class III have severe limitations that reduce the choices of crop plants or require special care to save the soil and water or both (fig. 15). The lower number of practical alternatives and the extra effort to conserve soil and water distinguish class III from class II lands.

Limitations of class III land restrict the amount of clean tillage; the timing of planting, tilling, or harvesting; the choice or yield of crops; or two or more of these. Most of the limitations on class III land were there before the land was used for crops. For example, these limitations include gentle to strong slopes, somewhat sandy soil, shallow soil, and too

USDA Photo

USDA/SCS Photo by E. W. Cole

Fig. 14 On the class I land (left), risk of damage by either wind or water erosion is low. On the class IIe land (right), conservation practices are needed, but they are easy to apply.

little or too much water. Some may be the result of erosion brought on by the way the land has been used.

Class IV

Soils placed in class IV have very severe limitations that make these marginal for common field crops, require extra care when cultivated, or both (fig. 15). The needed practices may not be as effective as they are for class II or class III land. Most class IV land can, with proper safeguards, be used for pasture or range, wildlife food and cover, recreation, or woodland if the climate is favorable. Some soils are placed in class IV though climate or overflow prevents planting or harvesting in a bad year. In humid areas, many sloping soils that are suited for field crops once in a while, but not year after year, are in class IV. Some poorly drained nearly level soils that are not subjected to erosion, but are poorly suited to some crops because of wetness, frequent overflows, or low yields, are placed in class IV. Some class IV land is well suited for special crops such as rice, truck crops, fruits, nuts, or ornamental trees and shrubs.

In a somewhat dry climate, class IV land may produce good yields of some crops in years of above-normal rainfall, low yields in years of normal rainfall, and crop failures in years of below-normal rainfall. In such a climate, special practices are needed to conserve moisture, maintain soil productivity, and prevent wind erosion.

Class V

Soils placed in class V have few or no erosion hazards, but they have other limitations that are difficult to remove by practical means. The limitations prevent tillage of crops with standard farm equipment. Class V lands are restricted largely to pasture, range, woodland, wildlife food and cover, recreation, or watershed protection. Though the land is nearly level or gently sloping, it is wet, stoney (fig. 16), often overflowed by streams, or the growing season is too short for most crops.

Fig. 15 Class IIIw land (left) is flooded for use as a duck field. Erosion from heavy rains caused the damage to unprotected class IVc land (right).

Class VI

Soils placed in class VI have severe limitations that, for the most part, make them unsuitable for tillage and restrict their use largely to trees, pasture, range, recreation, watershed protection, or wildlife food and cover (fig. 16). Some are well suited for woodland, but some are not since the growth of trees depends on climate as well as soil.

Range or pasture improvements such as seeding, liming, fertilizing, and water control by means of contour furrow, drainage ditches, diversions, or water spreaders are practical.

Class VII

Some class VII land can be used safely for common crops if managed with extreme care. Some also can be used for long-term meadows and sodded orchards that do not require tillage or for special crops, such as blueberries, that grow in special conditions unlike those that are best for common crops.

Soils placed in class VII have one or more very limiting features that cannot be changed without reclamation. The limiting features make them unsuited for common crops that need tillage and restrict their use largely to grazing (fig. 17), woodlands, and wildlife food and cover. With specific management practices, a few can be used for special crops such as cranberries and certain ornamentals. Because of physical features of the soil, pasture or range improvements, such as seeding, and water control measures, such as contour furrows, ditches, diversions, and water spreaders, are impractical to apply. This is a distinguishing difference between most class VI and class VII land. Some class VII land is well suited for woodland; some is not, mainly because of climate with only a small amount of water being held by the soil.

USDA Photo

USDA/SCS Photo by D. R. Warren

Fig. 16 Level clas[s] [land] (foreground) cannot be cleared of rocks by practical means. C[ultivated] [land] (right) is too steep for safe cultivation but is suitable for pastur[e].

Class VIII

Soils and land forms placed in class VIII have limitations that preclude their use for plants grown to be harvested. With major work, a few can be reclaimed for special use. Some have scenic value. Benefits from wildlife use, watershed protection, and recreation are possible.

Badlands, rough outcrops, sandy beaches, mine tailings, and other nearly barren lands are in class eight (fig. 17).

Other Classification Considerations

In making the land-use capability classifications, certain judgements and assumptions are made as to how intensive a use can be safely made of the land. The land capability classification is based on the combined effects of soil features and climate, on the risk of soil damage, on limitations of safe use, and on the difficulty of applying conservation practices when the land is cultivated. It should be noted that shrubs, trees, and stumps are not considered soil features and do not affect land capability classification. Land capability classification is an interpretation made from several factors and may differ considerably from what can be measured or seen by looking at the soils.

Limitations are judged as they relate to current soil-use practices in the United States. Therefore, as practices change, soil classifications also need to change. As technology changes, soil classifications may also have to be changed. For example, rocky soils that cannot be tilled with machines in this country are classified as unsuitable for cultivated crops; in another country where the land is tilled by hand, they might be classified as good for cultivated crops.

Some soils can be reclassified because of practices that are carried out on them. For example, some wet soils can be drained, some dry soils can be irrigated, some salty soils can be leached of toxic salts, and some overflows can be controlled. If a soil feature that limits

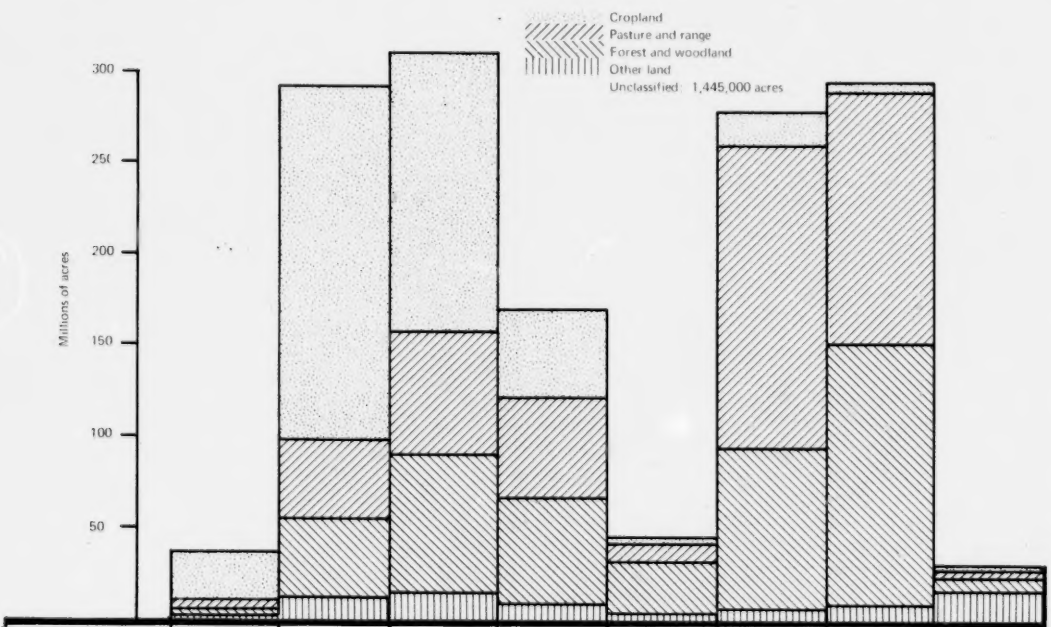
USDA Photo

U.S. Forest Service Photo

Fig. 17 Sheep grazing (left) on open sagebrush range, class VI land, and moving toward the slopes, class VII land. Class VIIIs land like this rough rocky area (right) has limitations that prevent its use for any type of farming—even for grazing or timber.

the use of the land for common field crops is changed, the soil is classified to reflect only the limitations that still affect its use. Some soils have features that are not feasible to change and are not classified to reflect all the limitations.

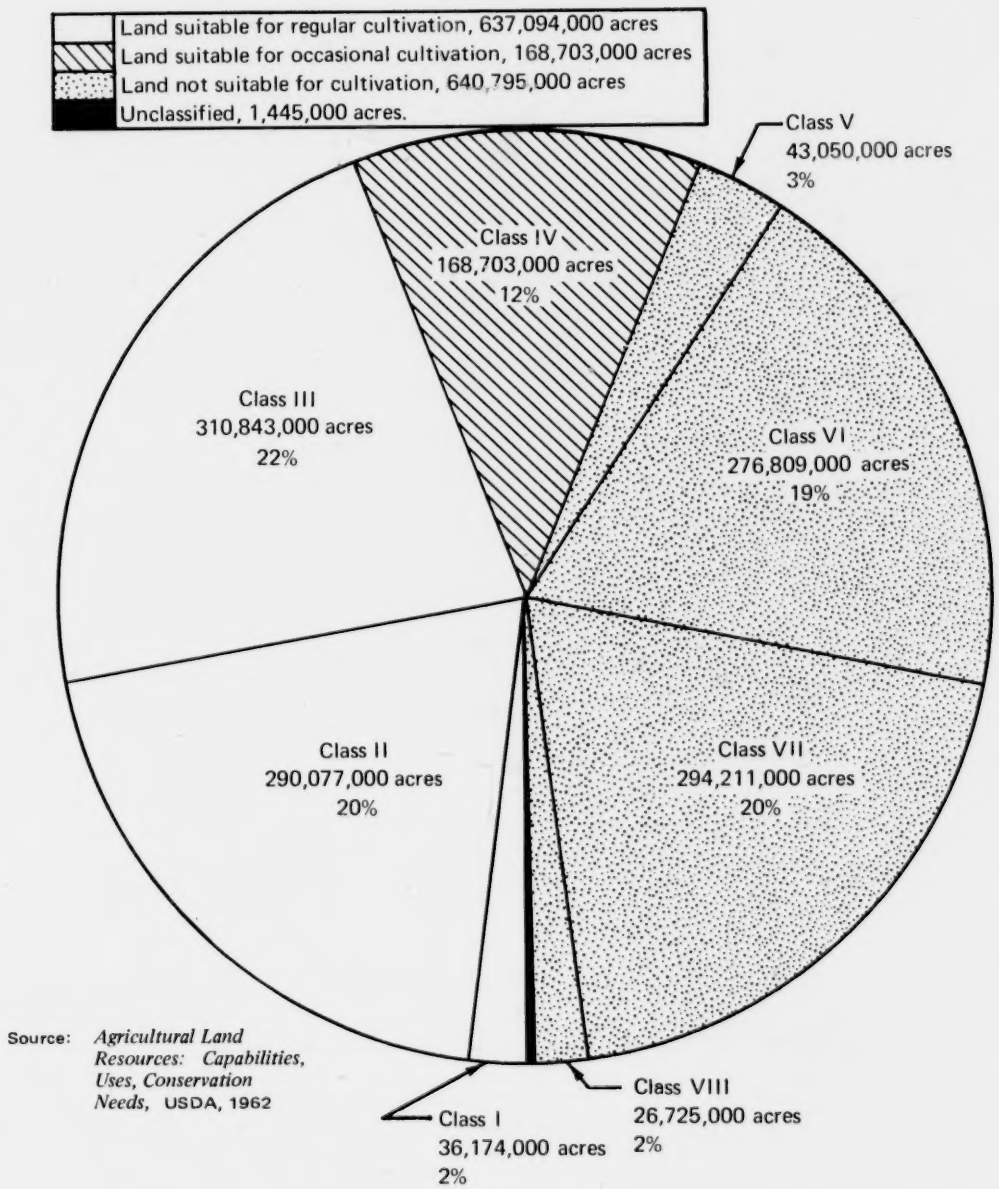
Land capability classifications help make broad summaries for cultivation and other uses. Land use by land capability class is shown in figure 18. A summary of the eight classes of land capability is useful even though it reveals only major suitabilities and limitations. Such an evaluation cannot begin to show the kinds of soils that must be considered in planning and caring for crops; in managing rangeland or forest; in building a house, a dam, a highway; or in planning recreation sites or wildlife habitats. More detailed mapping and land capability characteristics, including local land capability units, will improve planning and development. Recent United States Department of Agriculture statistics reveal the following about the United States non-Federal rural land in the 48 mainland States: Approximately half of the land is suited for cultivation. The other half is better suited for uses that keep it in long-time plant cover. Only 2% of this land or 36 million acres is in land capability class I (fig. 19).



	I	II	III	IV	V	VI	VII	VIII
Cropland, acres	27,418,000 76%	192,808,000 66%	152,885,000 49%	48,909,000 29%	1,773,000 4%	17,905,000 6%	5,634,000 2%	66,000
Pasture and range, acres	3,939,000 11%	42,837,000 15%	66,547,000 21%	53,860,000 32%	10,524,000 25%	166,060,000 60%	138,422,000 47%	2,518,000 10%
Forest and woodland, acres	3,570,000 10%	43,157,000 15%	77,573,000 25%	58,106,000 34%	28,921,000 67%	87,940,000 32%	142,686,000 48%	6,443,000 24%
Other land, acres	1,247,000 3%	11,275,000 4%	13,838,000 5%	7,828,000 5%	1,832,000 4%	4,904,000 2%	7,469,000 3%	17,698,000 66%
Total acres	36,174,000	290,077,000	310,843,000	168,703,000	43,050,000	276,809,000	294,211,000	26,725,000

Source: *Agricultural Land Resources: Capabilities, Uses, Conservation Needs,* USDA 1962

Fig. 18 Land capability and land use.



Source: *Agricultural Land Resources: Capabilities, Uses, Conservation Needs*, USDA, 1962

Fig. 19 Land in classes I through VIII

All other land needs conservation treatment to some degree if used for a crop that requires tillage with standard farm equipment (fig. 20). Approximately 44% of non-Federal rural land, or 637 million acres, is in classes I, II, or III. This is the land suited for regular cultivation. About 372 million acres of this land is used for cultivated crops. The rest is in nonfarm uses.

Planning Land Use

Historically, Americans have believed that "That government governs best which governs least." Toward the end of the 19th century (the late 1800s), certain activities were taking place in the free-enterprise system that caused many persons to begin to doubt their attitudes toward complete freedom for free enterprise. Abuses in industry and big business and exploitative business practices of even a few unscrupulous operators led more persons to challenge the ideas and ideals of business practices. They also began to ask questions about the idea of rugged individualism.

These questions and others like them led many individuals to turn more and more to collective and group action. The forming of cooperative groups helped to settle differences within the group and to present a more united front to those with whom they dealt. The combined action of the group often greatly enhanced chances of success. Businessmen became active in corporations and trade associations. Laborers became active in labor unions. Farmers joined cooperatives and organizations that could unite farm political pressures. These and other citizen groups began to look to Government for more action

USDA Photo

Fig. 20 This class I land can produce great quantities of food with a minimum conservation hazard.

programs to help them. As the demand for Government intervention and services grew, because of pressure from these many groups, it was easier for the Government to become involved in the planning of both economic and social actions.

As the Government became more involved in everyday activities, the demands became even greater for regulation of some activities. The Government involved itself with the regulation of food and drugs. Industry safety standards were set. The Government regulated interstate travel and in some instances set the rates. Minimum-wage laws were passed. The Government obtained land for use in forests, parks, and for recreation and wilderness areas. The Government actively promoted rural development and urban development, giving loans, planning assistance, making grants, and in some cases actually building housing. Social security came to cover a large portion of the population, and many changes took place in welfare programs.

Important economic and social planning should influence land-use decisions. Public demand for land-use planning increases with decreasing supplies of available land or of land suitable for certain purposes. Thus, as population density in an area increases, there is generally more demand for public action in directing land-use practices. Often during times of stress, because of insufficient supply of land resources, citizens come to the conclusion that complete freedom in the free-enterprise system does not always lead to the best land use as they view it. In order to incorporate social values with economic values, new laws and regulations are necessary.

Much of the early planning was done during the founding of new cities. Philadelphia, planned by William Penn in 1682, and Washington, D.C., planned by Major Pierre Charles L'Enfant in 1791, are two examples. Most of the world's major cities have grown without benefit of advanced overall planning. Major cities around the world now have one or more persons in charge of planning. The importance of planning has become more apparent—too often because lack of planning resulted in severely blighted areas.

Many cities have developed master plans that include projected needs for many years in the future. The master plan consists of maps, reports, and studies. These are continually revised so as to keep them up to date. Planners make studies and collect information, then plan on the basis of what presently exists and what is projected. Two important figures are employment and population. These two figures give planners the basis on which to plan needed residences, industrial areas, shopping areas, recreation areas, and other land uses.

Planning should be based on long-range goals and include the private enterprise system. The Seattle and Everett areas have found themselves in financial trouble at least partly because of very heavy involvement in one industry. When the aerospace industry hit bad times, so did this area. Better planning could have at least lessened some of this problem. The economy and growth patterns must be somewhat predictable before city planning can be very effective. A diversification of industry can be quite helpful in this regard.

A master plan generally divides a city into neighborhoods or other subdivisions. Plans are then made to meet each neighborhood's needs. These will likely include an elementary school, one or more churches, a shopping area, one or more playgrounds, and other facilities. A grouping of nearby neighborhoods may require a high school, parks, a larger shopping center, health facilities, a library, and some areas for business and industry.

Other maps or data describe plans for transportation of both people and goods. This includes highways and streets, railroads and terminals, airports, buses, elevated and subway terminal lines, truck terminals, and port and harbor facilities.

City governments have many ways of guiding growth according to the master plan. Zoning ordinances control land use and establish building standards such as height, area, and distances from the front or edge of a lot for each building built. Such ordinances may have great control over small businesses and may be influenced by small pressure groups. Areas may be designated as single-dwelling housing areas only. Other areas may be zoned for apartment houses, office buildings, stores, and industry. Many other things, such as width and location of roads, sewers, and sewage treatment and water facilities, may be controlled by ordinance. Codes such as building, housing, and sanitary, help regulate building structure, plumbing, wiring, use, and occupancy. These codes may be important in protecting public health, safety, and welfare.

An important governmental power is that of eminent domain. The Government may purchase private property for public purposes such as for roads or public buildings. Using the power of eminent domain, the Government may condemn and purchase slum areas or other land and make a plan for rebuilding or for other uses of the land.

Although many accomplishments of city planning can be pointed to with pride, it is becoming widely recognized that many planning problems do not stop at the city limits. What is best in a local situation or in the short term is not always best for a larger area such as a region or State, or for long-term use. Regional planning boards have become much more common because of the many problems that affect these larger areas. Regional planning boards sometimes cover a county or even a combination of counties. In this way, larger areas are looked at, and planning is done on a broader basis. Some problems even overlap such regions. Long rivers such as the Mississippi, Colorado, and the Columbia may flow through several regions, a State, or several States. Such situations may require statewide or even interstate planning. The planning and construction of interstate highways requires planning at the national level. Many of the principles of planning are at least similar, regardless of the geographical area for which the plan is made.

An important factor in planning is to understand that there are at least two important groups having wide-ranging effects on the lives of all of us. The first group is interested primarily in political and social action. The second group includes professional workers and others involved in ecology, agriculture, forestry, hydrology, and other natural resource areas. Both of these groups have great interest in future developments within our country. In many instances they have quite different views.

One method of enlarging the geographical area being worked on has been to establish special-purpose districts. These districts may impose regulations covering water supply, sewage disposal, river purification, education, transportation, or conservation systems. Although arguments can be given as to the advantages of having "experts" handle the management of each of these systems, there is little cooperation among the districts operating in this fashion. Regardless of whether regional systems or special-purpose districts are used, there needs to be more cooperation between the politicians making legislative decisions and the professionals who have the expertise to study the problems and help derive the best possible solutions.

Public Lands

Public land is used for many purposes, and the purpose for which it is used has considerable influence on the kinds of conservation practices applied. Lands owned by States may be controlled by a number of different agencies. Sometimes more than one agency is involved in managing State-owned property. For example, a forest area might be jointly managed by a State forest agency and the State parks and recreation agency. Each agency may have different regulations to control its land-use policies.

States hold title to 80 million acres of land. More than 30 million acres are set aside for parks, wildlife preserves, forests, and related uses. Most of the remaining 50 million acres are grazing lands. Income derived from this land is used primarily for public schools.

Public forest lands have been used mainly for timber production and watershed protection. Now they are being developed for multipurpose use as well. This allows public forest land to serve as wildlife sanctuaries, for grazing livestock, and for recreational purposes.

Many of the great national parks are truly national attractions that serve the entire Nation. Therefore, it seems right that the entire Nation should share in the cost of maintaining and operating them rather than the States in which they are located. Much of the land presently held in public ownership as forests, wildlife preserves, parks, grazing lands, and other purposes are areas that do not lend themselves well to good conservation under private ownership. Frequently this land has reverted to public ownership because of delinquent taxes. Through Federal and State regulation and control, much of this land has had conservation practices applied that would be economically impossible for individual owners.

There is little question that every person has an interest in good conservation. However, questions arise as to what kind of land-use regulation programs the Government should develop and employ. Also, there are the questions of how much payment should be made to see that good land use is achieved and in what form payment should be made. Another topic of debate through the years has been how much land should be held in public ownership. In addition, there is some discussion as to how much of the public land should be in Federal ownership and how much in State ownership. Public ownership interest as well as many traditions built up by past policies make this a complex problem with no quick or easy answer.

More than 50% of all the State-owned land is in the 11 Western States. Most of this is land that was originally given to the States by Federal grants to provide income for schools and other public improvements. Many of the Western States have only relatively recently developed rational procedures to classify land and get it into the most suitable ownership and use. This has allowed these States to make policies after they found themselves the owners of great acreages of land. In many cases, these States were also able to profit from the land-use policy development experience of other States. Washington is one of eight States that have retained the major portion of their school grant land. The other seven are Arizona, Montana, Wyoming, Idaho, Colorado, New Mexico, and South Dakota.

At its peak, the public domain included nearly 2 billion acres. The fact that this has been cut to approximately 180 million acres in the continental United States has led many persons to believe that the management and control of public lands is no longer an important and significant factor in total conservation operations. The fact is, however, that

the annual receipts from the public domain lands have now risen to about $230 million per year. This is the highest annual income from public lands in the history of the United States.

The history of public domain lands can be roughly divided into three periods. First was the period of acquisition that started at the beginning of the Nation. States granted their western land to the Federal Government. The Federal Government obtained land through conquest, treaty, and purchase. The Federal Government, in turn, disposed of some of these land holdings, transferring them to private ownership as rapidly as possible. More than 1 billion acres of the original public domain was involved in sales and grants to war veterans, to States for education and internal improvements, to railroads, to homesteaders, and others. This disposal of the public domain was the second period. The third period, and the one we are presently in, is management of the remaining public domain.

The management used on present Federal land depends to a considerable extent on the type of land. More and more multiple-use management is being employed in the administration of public ranges and forests. (Various uses are being made of the land as long as they are consistent with conservation of land and resources while providing for good use and value of the land.) Provisions are made for proper grazing, range improvement, conservation of soil and moisture, weed control, fire control, management of forest and woodland, wildlife, and recreation. Plans for management are based on studies conducted to determine the effects of past and present use. Land management at present can be improved greatly. Research is continuing to improve the information on which land management is based.

Improvements are constantly being made in range and forest land. Many areas have been fenced, and improved water facilities have been put in for easier handling of livestock. Such projects are often done on a cost-sharing basis for those using the range.

Better inventories of land in the public domain have provided information for making better decisions. Such inventories, besides helping to determine the volume of usable timber, have shown the capability of public lands to grow timber and have also shown reforestation needs. Other data have been gathered to help plan more intensive protection and management of timber, water, and recreation resources.

Management programs have been aimed at reducing soil erosion and improving vegetation on public ranges. They include reseeding, contour furrowing, controlling brush, controlling insects and rodents, and improving the availability of water through dams, dikes, and other such facilities. In forested areas, the practices have consisted of protecting forests against fires, insects, and other causes and converting over-mature forests to thrifty stands of younger timber. Through such management programs, annual sales of timber from Federal lands have reached well in excess of 100 million board feet per year. The value of this production is well in excess of $2 million per year.

Other lands have been used for military purposes. In recent years, the military has used land areas roughly equivalent to the size of any one of the following States: Indiana, Virginia, Kentucky, or Tennessee. The land used by the military varies greatly in size of the facility and value of land used for the facility. For example, ordnance plants must meet standards requiring nearly the best land in a community. Ordnance plants produce military supplies including weapons, ammunition, combat vehicles, and maintenance tools and equipment. They must be on land that can be excavated deeply and easily for heavy foundations. Deep soil has another advantage in that it will not carry explosive shocks so far as land with shallow, rocky soil. They must also be located where good transportation by

railroad and highway is available. Much water is needed, and so the plant must be located near a river. Because of the large amount of hauling that must be done, the land must be reasonably level. The land must be located in open country for safety and yet close enough to population centers to ensure an adequate labor supply. Thus, it is often the very best agricultural land that is used for such a facility.

Land used for ordnance depots, shell loading plants, and storage areas need not be near abundant water supplies, but otherwise they must have about the same site requirements as the ordnance plants. These again take up excellent agricultural areas.

Airfields, whether for military purposes or otherwise, need to be located on relatively level land. Level land is particularly needed for the runways. The area near the airport must also be open or cleared at much additional expense.

Military camps and maneuver areas have as a rule been located where there is a minimum of agricultural activity. Many of the areas where military camps have been established have not been used for crops and are not well adapted to crops. It has been considered an advantage to locate such camps not far from sizable cities so that adequate and varied recreational facilities are available for a large number of men.

Indian lands are managed by the Federal Government essentially as a trusteeship. These lands are held by tribes and individuals and in many forms of ownership. The Government uses over half a million acres in administering Indian affairs. Over 50 million acres used, controlled, or owned by Indians are subject to trust. Most of the 50 million acres are protected against alienation (conveyance of property to another) and encumbrance (a claim or lien upon an estate). Also, most of this land is exempt from State and local taxation.

There is considerable debate as to how Indian lands should be managed. Some of these lands have been sold and the proceeds given to individual tribal members. In other cases, the land is held in trust for the entire tribe. Because of increased land values, many individuals have urged the Government to sell their land and give them their money.

Indian lands held in trust by the Federal Government are administered for the use and benefit of the Indian owners in accordance with the policies usually used by the Department of the Interior in managing public lands. Accepted principles of conservation are the basis for specific treatment of forest lands, rangelands, irrigated lands, and general farmlands.

Mineral leasing has been an increasing source of income for some Indians and tribes. In these cases, mineral rights are often leased to large mining companies. The fees are paid to the landowners whether or not any minerals are found.

Indian forest lands amount to about 16 million acres. About 6 million acres are considered commercial forest land, more than half of which is in the Pacific Coast and Northern Rocky Mountain States. Most of the timber is sold on the open market as standing timber. A few tribes operate sawmills on their reservations to utilize their timber. All phases of forest management and protection are supervised by the Bureau of Indian Affairs, which designates the timber to be cut, measures the volume, and distributes the receipts to the Indian owners. The Indian owners are encouraged to participate in the development of plans for managing the estate. The consent of the owners is obtained before the timber is sold.

Rangelands amount to about 44 million acres, including the forest lands that are grazed by livestock. They are managed so as to bring the maximum return to Indian owners consistent with sustained production of forage. Indian owners are encouraged to use the range for grazing their own livestock. Approximately 75% of the range is used by the Indians. General grazing regulations were adopted in 1931 to limit the grazing of each unit

to the estimated capacity. This has helped in conservation by keeping areas covered that were formerly overgrazed (fig. 21). Management methods have been improved steadily.

Irrigation projects have also increased the productivity of Indian lands. The first irrigation projects on Indian land were undertaken by the Bureau of Indian Affairs over 100 years ago on the Colorado River Reservation in Arizona.

The preceding gives some examples of how public land is used and managed. The emphasis has changed from one of transferring public lands to private ownership as rapidly as possible to a very selective land sales policy. This has taken place since 1934 and the passage of the Taylor Grazing Acts. Lands are still selectively sold and other property is also purchased on the basis of need and long-range plans.

Societal Values in Land Use

Good conservation and meeting societal needs are not always in the best economic interest of landowners. In a democracy such as ours, laws are often passed to force landowners to do some things more in line with the wishes of the society as a whole. In some cases, the Government uses monetary incentives instead of legal coercion to induce owners to use their land in certain ways. As an example of such a program, the Agricultural Conservation Program (ACP) was an effort by the United States Department of Agriculture in cooperation with agricultural producers to preserve and improve the Nation's farmland, water, and timber resources. Under ACP, the Federal Government assisted landowners and farm operators by sharing costs of performing conservation work approved for that county. Recently, the Agricultural Conservation Program was reorganized and renamed. It is now called the Rural Environmental Assistance Program (REAP).

At the present time, the landowners bear the primary responsibility for conservation of the land. Clean air and water and a beautiful productive country are of concern to all, whether they are rural or urban dwellers. Goals of agricultural conservation programs have been and will likely continue to be the following:

USDA Photo

Fig. 21 An overgrazed range in New Mexico.

- Soil erosion control
- Healthy stands of trees
- Luxuriant growth of pastures and rangeland
- Safe disposal of excess water or conservation of scarce water
- Plentiful habitat for wildlife
- Beautiful countryside

Some REAP practices are shown in figure 22.

Major categories of practices that have been carried out under United States Department of Agriculture conservation programs are listed below:

- Vegetative Cover Practices–Seedbed preparation, seeding, liming, fertilizing, and other measures needed in the establishment or improvement of grass and legume cover for soil protection
- Forestry Practices–The planting of trees and shrubs for forestry purposes and for erosion control, and the improvement of established stands of trees by such measures as thinning, pruning, and the control of competing and undesirable vegetation
- Establishment of Conservation Systems of Farming–The construction of terraces and the performance of farming operations on the contour or in strips for the prevention of wind or water erosion
- Water Impoundment Practices–The construction of dams, pits, or ponds for erosion control, livestock water, irrigation, or other agricultural purposes
- Disposal of Excess Water–The construction of sod waterways and the installation of farmland drainage systems
- Conservation and Effective Use of Water–The lining of irrigation ditches, leveling of land, and installation of structures to conserve water, to prevent erosion, and to permit more efficient use of irrigation water
- Wildlife Conservation Practices–The establishment of vegetative cover that will provide food, cover, and habitat for wildlife as well as soil protection, and the impoundment of water for fish and other wildlife

USDA/SCS Photo by M. G. Hassler

USDA Photo

Fig. 22 Sod waterway (left) allows water to run off with less erosion. Cross-slope strips (right) improve pasture and pond.

- Beautification and Conservation Practices–The performance of measures that will enhance the appearance of areas visible to the public and at the same time provide substantial soil and water conservation benefits.

Other types of programs that the Government has established for conservation include the Appalachian Land Stabilization and Conservation program. Contracts under this program provide for land stabilization, erosion, and sediment control, reclamation through changes in land use, and the establishment of measures for the conservation and development of soil, water, woodland, wildlife, and recreation resources. This program accelerates the conservation work in selected project areas and supplements other Appalachian region programs. Emphasis is placed on solving conservation problems inhibiting economic growth. Cost-sharing agreements are for periods of 3 to 10 years. The Federal share may not exceed more than 80% of the treatment cost. Not more than 50 acres of land for any one person may be included in the program. Cost sharing is limited to $50 per acre and $2500 per contract.

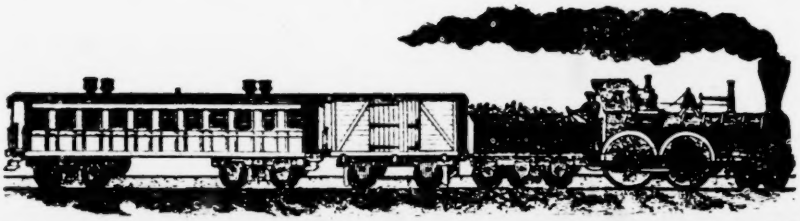
Other interesting programs include cost-sharing payments to farmers and landowners for allowing the general public free access to land designated under specific agreements. This allows the public free access for the purposes of hiking, hunting, fishing, and trapping. Under other programs, the Federal Government may help communities acquire land for open space for a period of years or may help them purchase land for such purposes. Society's values have long been tied into land use.

In May 1862, Congress passed the Homestead Act (fig. 23). This act provided that citizens (or aliens who intended to become citizens) who were over 21 or the head of a family could obtain title to 160 acres of public land. To obtain title, a person had to live on and improve the land for 5 years, or as a substitute for the 5-year residence requirement, the person could pay $1.25 per acre.

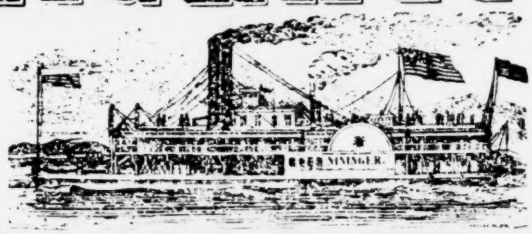
The Homestead Act was intended to improve worthless land and to help U.S. citizens to obtain small farms. Up to this time, the farmers had generally been against the Government's policies of selling land to raise money. Instead, farmers wanted the Government to sell the land at low prices or give it to settlers. Toward the middle of the 19th century, the homestead movement became a national political issue. Southerners generally opposed homestead bills. When the Southern States seceded at the beginning of the Civil War, the Homestead Act was passed. By 1900, about half a million families had found farms and new homes. Many of the laws passed since that time reflect the social values of the society. Examples of some of these laws will be discussed later under institutional factors in land use.

Nonrenewable Mineral Resources

Unfortunately, nonrenewable mineral resources are just that: not renewable. Two questions that we might want to ask are how available and how important are various metals? Metals vary in their availability and in their distribution. Some copper, iron, and aluminum ores are widely, but not evenly, distributed throughout the crust of the earth. Ores of many other metals, including lead, zinc, tin, nickel, tungsten, mercury, manganese, cobalt, the precious metals, and molybdenum, are not so distributed. The ores of these metals may be found in high concentrations in much fewer areas.



EMIGRATION



UP THE MISSISSIPPI RIVER.

The attention of Emigrants and the Public generally, is called to the now rapidly improving

TERRITORY OF MINNESOTA,

Containing a population of 150,000, and goes into the Union as a State during the present year. According to an act of Congress passed last February, the State is munificently endowed with Lands for Public Schools and State Universities, also granting five per cent. on all sales of U. S. Lands for Internal Improvements. On the 3d March, 1857, grants of Land from Congress was made to the leading Trunk Railroads in Minnesota, so that in a short time the trip from New Orleans to any part of the State will be made in from two and a half to three days. The

CITY OF NININGER,

Situated on the Mississippi River, 35 miles below St. Paul, is now a prominent point for a large Commercial Town, being backed by an extensive Agricultural, Grazing and Farming Country; has fine streams in the interior, well adapted for Milling in all its branches; and Manufacturing **WATER POWER** to any extent.

Mr. JOHN NININGER, (a Gentleman of large means, ideas and liberality, speaking the various languages,) is the principal Proprietor of **Nininger**. He laid it out on such principles as to encourage all **MECHANICS**, Merchants, or Professions of all kinds, on the same equality and footing: the consequence is, the place has gone ahead with such rapidity that it is now an established City, and will annually double in population for years to come.

Persons arriving by Ship or otherwise, can be transferred without expense to Steamers going to Saint Louis; or stop at Cairo, and take Railroad to Dunleith (on the Mississippi). Steamboats leave Saint Louis and Dunleith daily for **NININGER**, and make the trip from Dunleith in 36 to 48 hours.

NOTICES.

1. All Railroads and Steamboats giving this card a conspicuous place, or *gratuitous insertion* in their cards, **AIDS THE EMIGRANT** and forwards their own interest.

2. For authentic documents, reliable information, and all particulars in regard to Occupations, Wages, Preëmpting Lands (in neighborhood), Lumber, Price of Lots, Expenses, &c., apply to

THOMAS B. WINSTON, 27 Camp street, New Orleans.
ROBERT CAMPBELL, St. Louis.
JOSEPH B. FORBES, Dunleith.

USDA

Fig. 23 Posters such as these were common during early years of the Homestead Act.

The fact that these ores are unevenly distributed immediately brings political, social, and other factors into the problem of obtaining them. The importance of some of these ores to an industrial country may be overlooked. For example, molybdenum is used in steel production. It is also necessary in small amounts for animal and plant growth. Although relatively small amounts of this material are required, it is extremely important.

Other important mineral resources are fossil fuels. It is possible that nuclear power may be substituted for some of the fossil fuels presently being used. As with other nonrenewable mineral resources, the United States is highly dependent on foreign sources for many of its raw materials, except for bituminus coal. Because of the high demand for manufactured products, the United States imports large amounts of many basic industrial raw materials. The per capita consumption of steel is higher in the United States than any other country—667 times that of Indonesia, and twice that of such industrial countries as France and Switzerland.

Modern industrial societies are heavy users of mineral resources that are nonrenewable. Estimates as to the total amount of raw materials used by the United States vary greatly. However, it seems realistic to estimate that, with less than 6% of the world's population, Americans are using approximately a third of the world's raw materials, including more than a third of the world's tin production and over a quarter of the steel, phosphate, potash, and nitrogen fertilizers. This disproportionate sharing of the world's resources is likely to become a greater issue with those in the world who are not sharing equally.

It should also be pointed out that the United States has shipped out finished products for which these raw materials were used to all parts of the world. We have sent food to many countries. This has been possible only because of our highly developed and efficient industry. The United States has been held up as a model in many other countries around the world.

If underdeveloped countries are to have the chance to use their potential toward industrialization, it will require much greater availability of raw materials. It will also require capital investment and stable political institutions. If the world population growth could be stopped at the 1970 level, it would require the extraction of 75 times as much iron, 100 times as much copper, 200 times as much lead, and nearly equally astronomical figures for many other nonrenewable minerals to bring the rest of the world population up to the American standard of living. At present, few people in the world even have the goal of stopping population growth. At the same time, many developed countries are projecting increases in the rate of per capita consumption of nonrenewable resources well above 1970 levels.

With the increased population combined with increased domestic consumption, there is little doubt that the demand for nonrenewable resources will become critical within the next 50 to 100 years. There is, of course, the hope that some technological developments and discovery of new mineral resources will help lessen critical shortages. Conservation of present nonrenewable resources is going to become increasingly necessary. Projections of present world trends would lead one to believe that world industrialization is an environmental impossibility.

Thermal pollution and other ecological problems lessen the hope for obtaining cheap sources of power that might provide the answer to many mining and refining problems. Present and projected mining and refining procedures also hold little hope for satisfying the ever-increasing demands for nonrenewable resources that are being projected.

INSTITUTIONAL FACTORS AND LAND USE

Institutional factors include various aspects of group, collective, or social action that influence behavior. Many factors, including cultural, economic, political, religious, and social factors, interact in the process of our making decisions about land use. Each may be important in determining the decisions we make. Institutional factors influence economic behavior and, therefore, affect land use.

Economic Institutions

Hundreds of economic institutions exist. Many institutional factors act as important economic influences, even though their origin may be of a noneconomic nature and from a noneconomic institution. Many governmental controls such as taxes, price-control measures, and zoning may have great economic impact.

As institutional factors become more important in economic areas, they often become regarded as economic institutions. Different people may view a specific factor as being economic or not being economic to the extent that they would classify it as an economic institution.

Some of the commonly agreed upon economic institutions include public and private property, contracts, monopoly, and inheritance. Others may include such broad institutions as the free enterprise system and the profit motive. More specific factors would include labor unions, labor laws, and the national reserve system.

In recent years, there has been a continual expansion in the role of the Government in the United States. Much of this expanded role has come about because of the demand of the people for more control by the Government, for faster solutions in areas of conflict, to better protect the public, and to more quickly obtain social objectives. Almost all of man's activity is in some way regulated by the Government. Many of man's activities dealing with land use are directly and actively regulated by the Government.

Governmental Institutions

The Government affects land use in various ways. Real property taxes, which are often used to a large extent for financing schools, can often force the sale of lands or force the owner to use them more intensively. Inheritance taxes tend to break up large landed estates. The power of eminent domain can be used to acquire land for many types of governmental activity. Other aspects of the Government's police powers may be used to protect property rights and also to require compliance with health standards, building codes, or local zoning ordinances.

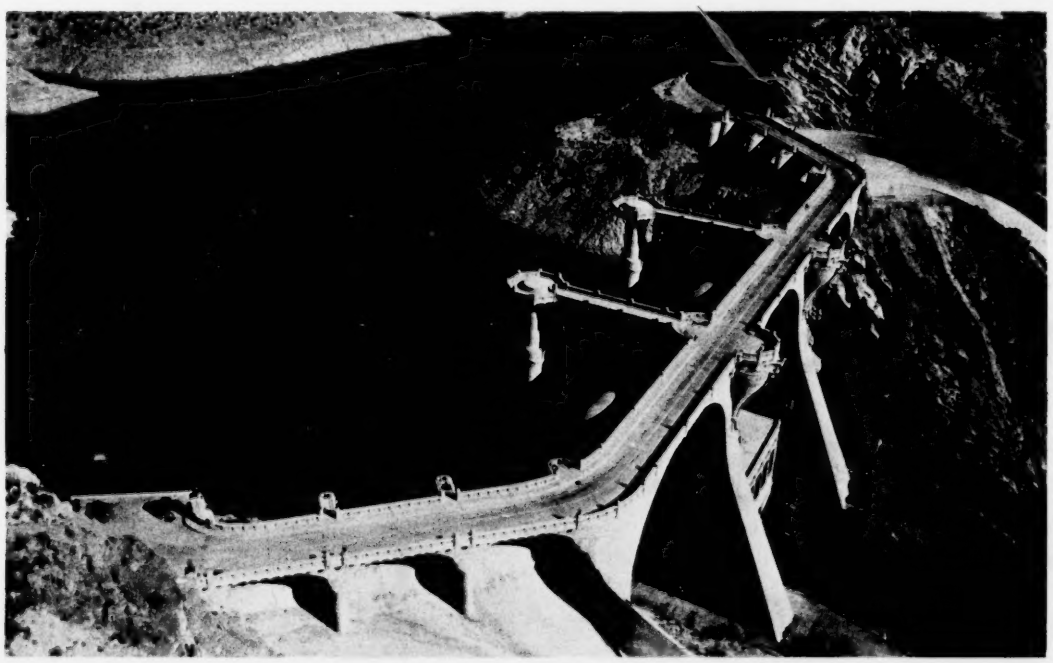
The Government's activities have had a great impact upon land use. For example, the early liberal policies in public land disposal created rapid settlement of much of our public lands. The development of public lands for forest, ranges, parks, and wildlife reserves have also affected land use and land values around them. The construction of large dams such as Coolidge (fig. 24) or Grand Coulee have allowed increased power production for individuals and industry and great quantities of water for irrigation.

Other public works programs, such as building highways, have taken land out of production and changed the accessibility and value of lands. The Government has established credit programs allowing persons to purchase lands that would otherwise be impossible for them to purchase. The Government has become involved in projects to provide housing for the poor and to decrease shortages of housing. Also, the Federal Government has established cost-sharing programs with individuals, States, and local governments to promote everything from highway construction to seeding along the edges of constructed highways. Cost-sharing programs have been made available to farmers to help them conserve their soils.

Zoning ordinances illustrate how Government directs land use. Zoning ordinances provide land-use regulations and restrictions. For example, land in a certain area may not be used for a "junkyard." In another situation, the type of buildings, materials used, and even the maximum height of a structure or its distance from a road or sidewalk may be specified. Many early ordinances were measures to provide safety and to control nuisances. Zoning ordinances tend to change slowly, thus problems arise as conditions change. Zoning ordinances vary greatly from area to area. Usually they protect the landowner or resident from nearby land being used for undesirable purposes. Since zoning ordinances are important locally, it is necessary to find out what is being done in your community.

Another important control measure is the regulation of subdivision development. This requires that if land is subdivided into building lots, certain regulations must be adhered to for each lot. For example, a minimum size may be required, or streets, sewage systems, or water systems may have to be installed. Exceptions to these regulations are common where only one or two lots of a farm are to be sold.

What are the subdivision regulations in your area? If you were to subdivide a 10-acre plot, what steps would you follow?



USDA Photo

Fig. 24 Large dams provide life-giving water.

Other special land-use controls may be set up on a district basis. This might be done for irrigation, drainage, grazing, weed control, or soil conservation in rural areas. In metropolitan areas, districts might be set up for water, sanitation, or park development. To set up a special district requires State enabling legislation. Then a new unit of government is set up to administer, tax, and carry out the purposes of the special district.

Still other land-use measures include building, fire, and sanitary codes. Building codes usually set minimum health and safety standards for all new structures. The codes set such standards as strength of structure, fire hazard prevention, and sanitary installations. Agricultural production controls may also be established to regulate the production of crops.

Another important land-use control measure is the power of eminent domain. This power enables Government or public utilities to take land without the owner's consent for the "public good." Land may be taken for schools, highways, streets, utilities, parks, military installations, or other public improvements. When this is done, a fair and just price must still be paid for it.

Government also affects land use by spending patterns and control of the land it already owns. For example, the types of services and cost of services at military installations or State or national forests may influence the surrounding area. If Government land can be rented for range or pasture or other uses, this will also have an effect. Types and costs of Government services offered to other citizens may also affect land use. Examples are police and fire protection.

Another important influence of the Government is in the area of law. Many of our laws have significant effects upon land use. Law comes from three sources: one is directly from governmental bodies in the form of statutes, ordinances, and regulations. A second source of laws is customs that have attained legal authority over a period of many years. A third source of law is that of judicial interpretations and decisions.

Educational Institutions

For centuries in many countries only the elite have been educated. This has allowed a strong, distinct class system to develop based at least in part on education. Most of the persons in the educated elite classes did not do manual labor.

In the United States, a great emphasis has been placed upon public education for all people. This mass educational system has increased the level of literacy and allowed greater numbers of persons to participate in decisionmaking and in operating their own land. In other words, greater numbers of the population have been given the training and facilities to make use of the economic and technical knowledge available. Research is being carried on at an ever-expanding rate, and more time and effort is being spent in disseminating this information to those who need it. This is part of the function of the Cooperative Extension Service, which has educated farmers to better methods. Increasing use has been made of television, newspapers, and magazines to allow more people to know what is happening in agriculture in less time (fig. 25). These sources of information and education have resulted in more rapid development, distribution, and acceptance of good land-use technology.

Religious Institutions

Throughout most of the world's history, religious institutions have owned or controlled large amounts of property. Religious institutions own a considerable amount of real property in the United States. The percentage that they own or control is small enough that it is not considered a serious problem in most areas. There is some concern, however, because religious institutions that own property are not taxed. Thus, when they are using the property for some type of production, they are considered by some to have an unfair competitive advantage. One area where ownership of land for religious institutions is sometimes considered a serious problem is in areas of high commercial value where considerable amounts of land may be taken up by a church that is not paying taxes and yet keeping the land from being used for what some would consider higher economic uses.

In the United States Constitution it is stated that church and State should be separate, so no taxes are set up to raise funds for religious institutions. Many of the religious institutions in the United States are supported by voluntary contributions or money-raising activities they themselves conduct.

Many civilizations and societies have had taboos that have affected land use. Some societies do not accept certain foods as edible or certain days as work days. Some of these customs have carried over into our present society and still have at least an indirect effect on land use. The Hindus, in countries such as India, have beliefs that do not allow them to kill a cow. This allows cows to increase unchecked. Since the cows are using up feed and food, usable agricultural production is decreased.

Some of the religious beliefs of previous generations no longer are accepted and thus do not affect land use. Other religious beliefs, such as the Golden Rule and respect for authority, become so accepted that they almost become societal standards rather than religious beliefs. Another important concept that has come from religious institutions is the idea of stewardship of land. Stewardship is the idea that a man should use his God-given land with due respect to our creator. Out of this to some extent has grown the concept that it should be turned over to the next owner in at least as good condition as that in which he received it.

USDA Photo

USDA Photo

Fig. 25 Free USDA publications are distributed (left). Grades of meat and their uses are shown at a U.S. Dept. of Agriculture exhibit at the International Livestock Show in Chicago.

Custom and Habit

Although of a much less formal nature, custom and habit often strongly influence all that we do, including land use. In many cases, custom and habit become so strong that they are seldom questioned.

Custom is an accepted way of doing things. Most customs begin because someone has carefully gone through the decision process to derive a certain method. A farmer thinks of a new practice to apply to his fields that may improve the soil in a conservation sense and also is cheaper to apply than the original practice. His neighbors observe what he is doing and also try the new practice. Soon a majority of the persons in the area are using the new practice and it becomes an accepted way of life. Even newcomers to the community may accept this practice without question simply because of the prestige it has acquired through being used by almost everyone for many years. At other times, newcomers may impose their customs on the area.

The kind of diet that people select affects land use. Americans have become accustomed to eating large amounts of animal products. To produce the large quantities of animal products required, land has to be used for pasture and feed for livestock and poultry rather than for food crops such as the cereals and potatoes more common in some other countries.

The types and amounts of materials that we use for clothing also affect land use. As our wardrobes grow and increase in quality, they will likely demand greater production of cotton, wool, and flax, and also materials that can be used for synthetic fibers. Increased demands for leather goods will also increase the demand for some types of livestock.

SUMMARY

Land use is one of the most important policy decisions made in any country, and it affects nearly all the people. Many land-use direction and control measures are applied in the United States. Since special districts or small units of Government may make land-use policy, methods of carrying out the policy may differ from area to area. Because of the large number of people involved and the many situations that occur in land use, policy decisions are difficult and slow in coming. Authority of Government to direct land use stems from the police power of the State, which is among the most important powers held by Government.

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